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PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO THE

MANUFACTURE OF PAPER, PASTEBOARD, AND PAPIER MÂCHÉ.

PART II.—A.D. 1858-1866.

PRINTED BY ORDER OF THE COMMISSIONERS OF PATENTS.

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PREFACE.

The Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of Invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions; and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering therefore the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to this series of abridgments have been overlooked. In the progress of the whole work such omissions will from time to time become apparent, and be supplied in future editions.

This volume is a continuation of the "Abridgments of "Specifications relating to the Manufacture of Paper, Paste-"board, and Papier Mâché," already published, and brings the Abridgments to the end of the year 1866. From that date the Abridgments will be found in chronological order in the "Chronological and Descriptive Index" (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

This series of Abridgments contains inventions relating to the machinery, apparatus, processes, materials, and chemicals employed in making pulp for the manufacture of paper, pasteboard, and papier mâché, and the subsequent manufacture of pulp into paper, pasteboard, &c., including the finishing processes of drying, hot-pressing, glazing, and winding on the drum, but not such subsequent operations as cutting into sheets, folding or forming into special forms or shapes as envelopes, bags, &c.; these latter operations forming the subject of a separate series entitled "Cutting, Folding, and Embossing Paper." The present series also contains processes for treating waste and spent materials for their recovery or re-use in the manufacture.

"Pearl hardening," "doughing," and other "loading," "filling," or thickening ingredients or compositions, as well as sizing materials, are included when mention is made of their applicability to paper-making. Likewise some waterproofing compositions are included, when such are to be blended with the paper during its manufacture; but not water-proofing or other compositions which are applied to the paper as a coating after its manufacture; such inventions, together with staining, colouring, ruling, ornamenting paper, making paper-hangings, &c., being reserved for a forthcoming volume devoted to the general treatment of paper, subsequent to its manufacture.

For a wider collection of inventions relating to the various chemicals used in the different processes and stages of paper-making the reader should refer to the series entitled "Acids, "Alkalies, Oxides and Salts." Likewise a forthcoming series relating to starch, gum, size and other stiffening materials will have a more extended scope than the present volume respecting sizing and loading compositions in general.

Preparing paper for use in electric telegraph printing machines by submitting it to the action of chemical agents will be found in the series devoted to "Electricity and Magnetism." Treating paper for special use in connection with peculiar writing inks should be searched for in "Writing "Instruments and Materials." Similarly, other special processes for treating paper for particular purposes will be found in the series embracing the manufactures or arts for which such prepared papers are made.

With respect to papier mâché, several inventions relating to compositions called by that name by the inventors nevertheless contain little or nothing of the nature of paper or pulp, whilst other compositions more nearly resembling the original papier mâché are merely denominated substitutes for that material. Consequently it has been deemed advisable to include these latter substitutes as well as the so-called papier mâché inventions; but all similar compositions, as, artificial ivory, wood, leather, and other plastic compositions for moulding into various articles, are excluded.

H. READER LACK.

April, 1876.

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PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO THE

MANUFACTURE OF
'APER, PASTEBOARD, AND PAPIER MÂCHÈ.

A.D. 1665–1866.

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1876.

A.D. 1857, December 3.—No. 3001.

SLACK, Elijah.—"Improvements in the treatment, application, and use of wheat and other grains and amylaceous "vegetable substances."

1st. "The system or mode of treating and preparing grain "in order to obtain the starch, gum, or dextrine or amylaceous "substance therefrom, in which system or mode the grain is "treated in a whole or undivided state, the operations of "steeping, washing, bleaching, and drying being performed "prior to its being ground in the mill."

2nd. "The system or mode of treating and preparing bulbous roots and other generally similar vegetable substances "in a whole or unbroken or broken state, for the purpose of "obtaining the starch, gum, or dextrine therefrom."

3rd. "The system or mode of operating upon vegetable "substances containing starch or starchy matters by means of "alkaline, acidulated, or saline solutions."

The grains or roots, in a whole state, are thoroughly washed by agitation in pure water, they are then steeped in an alkaline solution, cut into small pieces by a cutting machine, drained, dried, and ground. The operations that follow are, sieving, bleaching, washing, scouring, drying, grinding in a mill, and finally, sieving through silk, hair, or wire. The vegetables under treatment are well washed to remove the alkaline matters from them; to free them fully from alkaline materials, they are subsequently treated with an acidulous solution and finally washed. "The starchy material, gum, or dextrine "obtained in this manner is well adapted as a stiffening, or "finishing material for paper, woollen cloths, fustians, and "other textile fabrics.

Other modifications of this process, in the treatmen of grain, &c. are set forth.

[Printed, 4*d*. No Drawings.]

A.D. 1857, December 15.—No. 3075.

HOGG, James.—"An improvement in the manufacture of "'copying paper.'"

Copying paper, manufactured in the ordinary way, is imbued

To be substituted for the corresponding leaf in Part I.

with a preparation of iron. The preparation that is preferred is the protosulphate of iron.

The preparation of iron may be incorporated "by any con-" venient means in the making of the paper (that is to say, "when the paper is in the pulp);" or after the paper is made, it may be passed "between felt-covered rollers supplied with "a solution of the proto-sulphate or other suitable preparation "of iron; or after the paper is made any other convenient "method of impregnation may be adopted."

The advantages of this improvement are:—1. A letter written with common writing ink (that has for its base the tanno-gallate of iron) or with any ink that contains tannin, when covered with a damp sheet of copying paper prepared as above, and then squeezed in a copying press, yields a good copy.

2. A letter written with ink similar to that just mentioned, but to which there has been added a little pyrogallic acid and sugar, when covered with a damp sheet of this copying paper, "will yield a good copy by the simple pressure of the hand. "It is only necessary to put a sheet of blotting paper or oil "paper between the damp 'copying paper,' and the hand, "and then rub over the writing firmly as in the act of blotting "a letter."

[Printed, 4*d*. No Drawings.]

End of Part I.

NOTE.

The preceding leaf is to be substituted for the corresponding leaf in Part I., whereof the remaining pages 173–185 are to be cancelled. The Preface and Index of Names of Part II. (second edition) supersede those of Part I.; and the new Index of Subject Matter comprises the contents of both volumes. A new Title-page is also added, to be used if it should be desired to bind both Parts in one volume.

ERRATUM.

Page 277, last line, *for* " printing " *read* " finishing."

MANUFACTURE

OF

PAPER, PASTEBOARD, AND PAPIER MÂCHÉ.

1858.

A.D. 1858, February 2.—No. 190.

SHOLL, James.—" Improvements in the manufacture or pre-" paration of paper for writing and copying purposes."

The invention has for its object to produce paper on which thin ink or writing fluid will become darker and more legible immediately after writing, and will also afford a good transfer copy.

Ordinary writing paper is immersed in a mixture of whiting or fine chalk dissolved in water of the consistency of cream, and after being so immersed for two or three minutes, has the superfluous chalk matter washed from it, and is dried. A quantity of the whiting or fine chalk is mixed with paper pulp, and the manufacture completed in the ordinary way, taking care to mix such a quantity of the chalk or whiting as will have the desired effect upon the ink when used for writing purposes, the object being to render the ink blacker and more legible, and will also yield a copy more readily than ordinary paper.

"The same mode of preparation or manufacture of paper is " adapted for copying papers, and causes the transfer copies " to be more easily transferred and more distinct than when " taken on ordinary copying paper."

[Printed, 4*d.* No Drawings.]

A.D. 1858, February 3.—No. 200.

TOUCHE, VICTOR.—(*Provisional protection not allowed.*)—" Improvements in the manufacture of paper."

In the ordinary beating machine is inserted a grated or wire gauge passage, through which the water passes, carrying with it dirt or other useless matter proceeding from the raw material, and leaving behind the fibre to be reduced to pulp, which is effected in the said machine by the continuous working of the cylinder. At the grated passage is also introduced a rotating brush, so as to keep a clear way for the aforesaid water to flow out. The fibre when thus prepared is bleached by the addition of the usual bleaching materials (the grated passage being then closed), and when washed out and reduced to proper length, is conveyed directly to the pulp vat to be converted into paper by the usual means. This part of the invention is applicable to the manufacture of paper from vegetable substances in general, as distinguished from rags.

" My invention further consists in producing pulp from " what is known as 'bass' or 'bast,' or fibrous material " possessing similar qualities, by the above-described con" tinuous operation without boiling, and also without the use " of alkalies or acids."

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 4.—No. 209.

BERTRAM, GEORGE, and MC NIVEN, WILLIAM.—" Improve" ments in the manufacture of paper."

The invention, which " bears more or less" on a previous Patent No. 2627, A.D. 1856 relates to the "knotting ma" chine," or pulp strainer, for straining or "knotting" the pulp prior to its actual conversion into paper, and may be carried into practice under three leading forms. 1. Where a cylindrical straining sieve is used, such, for example, as the arrangement described in the Specification of the previous Patent of 1856, where a "bellows," or expanding and contracting apparatus, is placed in the interior of the cylindrical sieve. This "bellows" consists of a duplex or other set of cylindrical discs, each pair being connected by means of leather or other flexible material, resembling the circular or cylindrical bellows of the smith's shop. These two or other sets of bellows' movements are disposed with their axes coincident with the horizontal axes of the cylindrical sieve, and their working discs are connected by means of a spindle passing outwards, with a crank or other reciprocatory movement. The interior of the bellows apparatus communicates by a suitable duct with the external atmosphere. The effect of this arrangement is that the alternate expanding and collapsing movement of the bellows apparatus keeps the sieving medium clear of deposit, so that the pulp has always a more effective straining medium before it in passing from the source of supply into the interior of the cylinder. The strained pulp is withdrawn from the interior of the cylinder at a lower level than the height of the pulp in the supplying vat. The expanding and collapsing or contracting arrangement may be made and worked in various ways, so as to obtain the necessary altenations of bulk in the interior of the cylinder. 2. A stationary or fixed frame may be used, with a sieve or strainer bottom on it, the strained pulp being passed upwards through the sieving or straining medium by the action of a bellows or expanding and contracting motion, such as has been already described herein. In the present instance the bellows are arranged to work in a chamber beneath the sieve bottom. 3. A fixed sieve bottom and frame are used, with a bellows arrangement beneath, causing the strained pulp to pass down through the bottom. In arrangements where the pulp is strained upward through a sieve bottom, or through a cylindrical sieve, the under or inner service of the sieving medium, or that surface against which the pulp first comes, may be kept clear of deposited matter by the use of a traversing brush or mechanical cleanser.

[Printed, 10*d*. Drawings.]

A.D. 1858, February 6.—No. 224.

WHITE, **William**, and **PARLBY**, **Josiah**.—"Improvements "in the treatment of carton pierre, papier mâché, and such "like plastic substances, and in the application of such matters "to walls, ceilings, and other internal parts of buildings, "berths, and other parts of ships and other vessels, carriages, "and other structures."

Producing moulded forms of the above materials in two or more colours. The desired colours having been given to the different quantities of the material to be employed, the portions of such respective colours are first placed in the desired parts of the mould, and having poured or pressed the same therein, we then apply to the general surface that which is to constitute the general ground. The improvements relate also to the production in carton pierre, papier mâché, and such like material, of imitation inlaying. For this purpose the moulds are formed to produce recesses or sinkings in the surface of the material at those parts where the inlays or representations thereof are to be obtained, and into the recesses thus formed is poured or pressed the material referred to, having the colour or combination of colour desired to be represented, or in place of, or in addition to, forming such inlay by the application of the same material in different colour, pieces of marble, alabaster, or other non-plastic substance may be introduced. Carton pierre, papier mâché, and the like, thus treated, are especially adapted to the covering or forming of walls, ceilings, and other surfaces, as well as to be moulded into other and various forms for house and other decorative furniture, cabinet work, chimney pieces, panels, boxes, cases, frames, screens, &c. In using plaster or cement as coating, considerable inconvenience is occasioned from the long time required before it becomes sufficiently dry for painting or other applications to its surface. Now the object of one part of this invention is to substitute for such damp plaster dry blocks or sheets of composition, such as referred to, strengthened with paper, or other fibre if desired, such dry blocks or sheets being previously moulded into the forms desired, with the surface thereof more or less highly decorated in relief, the joints or seams being arranged to be concealed by the overlapping of the ornament of one part over that of the other, or by the application of separate ornament, or by the general disposition of the ornamentation. Sheets or blocks prepared according to this invention are affixed to walls by first driving in plugs of wood at suitable distances, or by the aid of battens to which the blocks or sheets are made fast, or, as in the case of ceilings or roofs, to the joists or rafters.

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 15.—No. 291.

GARNETT, Jeremiah. — "An improved manufacture of "paper."

The invention relates to a means of making paper of different colours or qualities on the two sides at one single operation in the paper machinery. "In various trades paper for wrappers "and other purposes is required of different colours or qualities "on the two sides, and this article has usually been manu-"factured by taking two sheets of different colours or qualities, "and fastening or attaching them together by means of paste "or other analogous preparation. The mode here proposed "is as follows:—When a sheet of paper pulp has been suffi-"ciently consolidated in the machine in the ordinary manner, "I cause another sheet or layer of pulp of a different colour "or quality to be deposited thereon, and after the double or "compound sheet of pulp thus combined is passed through "the remaining part of the machine, a perfect sheet of paper "of different colours or qualities on the two sides is produced. "Sometimes in the manufacture of thick or heavy papers it "may be found advisable not only to have the two sides of "different colours or qualities, but in addition to form the "centre or middle part of the sheet of an inferior material, "so that the paper may be made of greater substance than "usual without increasing the cost. This triple combination "may be produced by first making a thin film to form one "face, then depositing thereon another thin film of a different "colour or quality to form the other face of the sheet."

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 20.—No. 340.

BETTS, William. — "A new manufacture of glazed or "enamelled paper."

The invention consists in preparing paper with size and colour, and burnishing the same by means of rolling friction produced by the surfaces of two rollers, moving in the same manner as the rollers of an ordinary rolling mill, except that the surface of one of such rollers revolves with a different velocity to the surface of the other, and for that purpose the paper is prepared by the application of a mixture of size and colour, after which it is brushed with French chalk in the usual manner of preparing coloured paper for enamelling; but instead of placing such prepared paper between copper and zinc plates, and then passing such plates and paper together through the rollers of a flatting or rolling mill, or burnishing such paper by means of hand friction with an agate or other suitable rubber, the sheets are pressed separately between rollers.

[Printed, 10*d*. Drawings.]

A.D. 1858, March 12.—No. 508.

COUPIER, JEAN THÉODORE.—" Treating vegetable fibrous " matters to render them applicable for the manufacture of " paper and pasteboard, and in apparatus connected there- " with."

The invention consists in boiling, washing in lye, and reducing, by means of super-heated steam, all fibrous vegetable materials suitable for forming pulps of paper, cardboard, and other like manufactures. The substances used for this purpose are those having a fibrous cellular tissue, such as straw, cane, reed, the dwarf palm, maize, straw, &c.

The straw, cleansed, chopped, and sifted, is left to soak for twelve hours in a solution of caustic soda, at a temperature of from 176° to 194°. The liquor is then drawn off and deposited in boilers to be concentrated therein, and afterwards removed to reverberatory furnaces to be incinerated. The tubs or vessels in which the soaking is conducted are furnished with false bottoms, about four inches from the true bottom, and between these steam is introduced through perforated copper tubes. The washing with steam being terminated, the straw is removed from the tub and placed in cylinders in order to undergo the necessary trituration. The pulp is then ready to be bleached " by the ordinary processes, and by the aid of a " quantity of liquid chloride of lime in the proportion of " fifteen per cent. of the weight of straw used."

[Printed, 4*d*. No Drawings.]

A.D. 1858, March 15.—No. 518.

MARTIN, JOHN COWDERY.—" An improved plastic compound " for the manufacture of moulded articles as a substitute for

" wood carvings, and for many of the purposes to which
" papier mâché is applicable."

The compound consists of 28 parts (dry) by weight of any fibrous substance of which paper may be made, reduced to pulp by means of an ordinary beating engine, 20 parts of resin or pitch, 10 parts of soda or potash to render the resin soluble, 24 parts of glue, 12 parts of drying oil, and 1 part of acetate of lead, or other substance capable of hardening or drying oils. The pulp after leaving the beating engine is to be drained and slightly pressed under a screw or other press to free it partly from water. The resin and soda are then to be boiled together and well mixed. The glue is to be broken up in pieces and melted in a separate vessel with as much water as will cover it and then to be added to the resin and soda, which mixture is then to be added to the pulp and thoroughly incorporated with it; the acetate of lead, well mixed in the oil, is then to be added, and the whole mass or compound is then to be thoroughly mixed. The quantity of resin and alkali in proportion to the glue used might vary, or the glue might even be dispensed with, when the acetate of lead would be proportionately increased. The compound is allowed to remain some days to free it partially from moisture, when it may be well kneaded and pressed into suitable moulds, the moulds being previously brushed with oil when the compound is worked sufficiently stiff, or with oil in which is mixed some acetate of lead when worked with more moisture. After leaving the mould the article taken from it is to be thoroughly dried or baked at a moderate heat, when it acquires many of the peculiarities of wood, as it may be cut or carved and polished if required.

[Printed, 4d. No Drawings.]

A.D. 1858, March 20.—No. 576.

HAIGH, William.—(*Provisional protection only.*)—" Im-
" provements in the manufacture of a certain description of
" paper and in the machinery connected therewith."

The invention relates principally to "brown paper" and other coarse qualities, and consists in imparting thereto the "finish" of a better class of paper. For this purpose the surface of common paper is enamelled by means of brushes or rollers or both, either with sulphate of barytes, white lead, china clay, or other similar and well-known substance as a body. The paper may be made in rolls of indefinite length, and coated with the enamel, and subsequently polished by being passed between and submitted to the action of an arrangement of calendering rollers, the surface being polished by the surfacing or polishing calendering roller revolving at a higher speed than the other, and when finished may be cut up into suitable lengths or sheets for printing or other purposes; or, if preferred, the paper may be made in sheets and the enamel applied during the manufacture of the paper and afterwards polished by machinery.

[Printed, 4*d.* No Drawings.]

A.D. 1858, March 30.—No. 676.

WHITEHEAD, WALTER GEORGE. — "A new or improved "waterproof paper."

The invention consists of a paper made waterproof by being impregnated with, or having spread upon it on one or both sides, a mixture or composition made of gutta-percha, india-rubber, shellac, and common resin, or other resinous matter. These materials are dissolved each in its proper solvent, and the solutions mixed together. The proportions employed vary according to the character of the waterproof paper to be produced. The composition when applied to the paper has a pasty consistence.

[Printed, 4*d.* No Drawings.]

A.D. 1858, April 6.—No. 739.

COLLYER, ROBERT HANHAM. — (*A communication from Martin Nixon.*) — (*Provisional protection only.*) — "Improvements in the manufacture of paper."

The invention consists in submitting straw while whole to a process of deglutinizing by the agency of alkali. Steam may be admitted for this purpose through holes of a pipe resting on the bottom floor of the kur or vessel in which the material is placed, and through a pipe into a vertical central pipe which is provided with a bonnet or other device for distributing upon the top of the straw the hot alkaline solution. Treated thus for about twelve hours, its knotty portion will be effectually softened, thus preventing, to a certain extent, the yellow pimples and specks so often present in straw paper. The alkali having been run off after boiling, the material is transferred to the ordinary rag engine, and operated upon until the water runs off clear; then, or subsequently, when reduced to fibre, sulphuric or other acid sufficient to neutralize and remove the alkali still remaining attached to the straw, is added and well mixed with the straw for about five minutes, and then washed out. The roller of the rag engine then acts upon and opens the straw into lint or fibre; while washing, and when sufficiently reduced, the bleaching liquor is added, and the whole run down into the steeping chests, where it remains about twenty-four hours; it then can be beat by itself or with other materials.

[Printed, 4*d*. No Drawings.]

A.D. 1858, April 22.—No. 894.

DONKIN, THOMAS. — (*A communication from Gabriel Planche.*) — "Improvements in apparatus employed in the " manufacture of paper, applicable also to controlling the " motion of travelling webs and fabrics."

In the manufacture of paper the endless wire upon which the pulp or paper is supported and carried through the machine passes over a guide roller, which, when the wire moves either to one side or the other of its proper path is restored to it by means of self-acting mechanism connected with a screw acting upon its shaft or scale. Upon each side of the wire, at a short distance from the guide roller, is placed a vertical guide connected to a horizontal transverse spindle or lever, which carries at its end a fork embracing a band or belt driven by any suitable running shaft. This band or belt passes round one or other of three pulleys placed side by side upon a shaft, the middle one being a loose pulley, the other two working a shaft connected with the axle of the screw " in such manner that when the vertical guides are moved " by the wire (as it leaves its bath) either to the one side or " the other, the band or belt shall be moved from the loose " to one of the other pulleys, whereby the screw shall be so " caused to act upon the guide roller as that it shall restore " the wire to its path."

[Printed, 8*d*. Drawings.]

A.D. 1858, April 27.—No. 925.

HUNT, EDWARD, and POCHIN, DAVIS.—"Improvements "in the treatment and application of resins and resinous "substances."

Among the articles in the manufacture of which the resins improved by this invention are applicable is paper. The invention consists "in distilling resins and resinous substances "without decomposition, or with a partial decomposition, by "which we free them from various mechanical impurities, and "at the same time partially deprive them of their colour. 1. "Ordinary resin of commerce, or other resinous substance, is "melted, and steam passed through the melted mass until the "whole or nearly the whole of it has been distilled. It is "condensed and dried, when it is fit for the ordinary pur"poses to which resin is applied. 2. Resins and resinous "substances are treated as above described, except that in "place of steam carbonic acid gas, or a mixture of carbonic "acid gas and nitrogen, or hydrogen gas, or carbo-hydrogen "gasses are used."

[Printed, 4*d*. No Drawings.]

A.D. 1858, April 30.—No. 965.

HUGHES, EDWARD THOMAS.—(*A communication from Pierre Denuelle.*)—"An improved regulator and float com"bined, applicable to the manufacture of paper."

By this apparatus, which is self-acting, a continuous delivery of pulp may be obtained independently of the variation in the speed of the paper machine, and also of the variations in the level or depth of the mass of pulp in the large vat or reservoir. The aforesaid arrangement forms part of the paper machine, both working and stopping together with mechanical regularity, and dispensing with the ordinary apertures and feeders. A pipe communicating with the large cistern or reservoir of pulp conveys the latter to a small box or cistern where the delivery is regulated as it passes to the machine by an adjustable conical plug agitated by the floater, motion being given by the paper machine. When once the cone, as adjusted, gives passage to the quantity of pulp required, the plug, having a proportionate cone, varies in the hole, giving a larger or smaller passage to the pulp falling on the machine, which, having had the same variations of speed, receives the pulp in conjunction with its speed, giving a paper of uniform strength.

[Printed, 10*d.* Drawings.]

A.D. 1858, May 8.—No. 1084.

NEWTON, Alfred Vincent. — (*A communication.*)—"Im-
" provements in machinery for manufacturing paper."

This invention relates to a mode of varying the width of the paper while the machine is in operation and during the process of manufacture, and consists in making the "lip" or basin which conducts the pulp from the vat to the endless wire apron of two parts, and in connecting these parts with the "deckles," which, as well as the "deckle straps," are, by a novel mechanism, rendered susceptible of lateral adjustment. The "deckles" determine the width of the pulp on the endless wire apron, and consequently also that of the paper, and as the two parts of the "lips" or basin which conducts the pulp to the apron are connected to the "deckles," one to each, the said two parts of the "lip" or basin are moved simultaneously with the "deckles," and consequently the "lip" or basin expands or contracts in width, so as to correspond with the width or space between the "deckles."

The invention includes a novel way of adjusting the usual gauge employed for the even distribution of the pulp on the endless wire apron.

[Printed, 8*d.* Drawings.]

A.D. 1858, May 10.—No. 1047.

PIM, John Bedford, and PAYNE, Charles. — "Improve-
" ments in recovering useful matters from oil or floorcloth,
" tarpauling, American leather cloth, and other like sub-
" stances."

Refuse, waste, or old pieces of the above materials are boiled in a strong solution of caustic alkali until the paint or matters with which the woven or other fabric is coated is quite separated therefrom. The cloth or woven fabrics are then removed from the mass, and the whole allowed to settle, during which the oil, colouring, and other matter, removed from the cloth, precipitates, ammonia being added to facilitate the process; the supernatant liquid is then drawn off, and the pasty mass recovered, which may be partially dried and used as a paint by a suitable admixture of turpentine or oil, and, if desired, colouring matter; to recover the oil instead of paint from the above-mentioned materials, the pasty mass is dried by heat or exposure to the atmosphere, and afterwards distilled. The woven material or cloth recovered from the alkaline solution is said to be suitable for the manufacture of paper.

[Printed, 4*d*. Drawings.]

A.D. 1858, May 21.—No. 1132.

HENRY, **Michael**.—(*A communication from Messieurs Vasseurs and Houbigant.*)—"Improvements in the manufacture "or preparation of ink and paper, to adapt them for copying "purposes; in preserving foods, skins, and hides, in rendering lint, vesicatory paper, and textile fabrics absorbent; "and in treating mortar, cement, and other matters, in order "to keep them in a damp state."

This invention is based on the peculiar properties of glycerine, in absorbing and retaining atmospheric humidity. By preparing either ink or paper with glycerine, writings may be copied without the pressing or damping. Paper may be prepared by introducing glycerine into the pulp, or by damping it, when manufactured, with glycerine. It may be kept invariably damp by impregnating it with glycerine diluted in four or five times its quantity of water, or the ink may be combined or prepared with glycerine.

An ink for preserving pens from rust is also described.

The combined action of the glycerine on the paper, and certain chemicals, as prussiate of potash, turnsol, Prussian blue, &c., produce colouring effects. Thus, in the first case, ink containing iron in excess will produce blue writing; in the second, ink containing acetate of iron will produce red, and alkaline ink green; and in the third, alkaline ink will produce white. Cement, paste, mortar, and other matters, where desirable, may be combined with glycerine to retain them in a damp condition. Vesicatory or blister paper, among other things, may be rendered absorbent by preparing or treating them with glycerine. The unsized paper used for copying writings will be rendered more effective by glazing, "pressing," or "satining" it.

[Printed, 4*d.* No Drawings.]

A.D. 1858, May 21.—No. 1137.

SHOLL, JAMES.—(*Provisional protection only.*)—"Improvements in the manufacture of paper used for letterpress, lithographic, and copper-plate printing, and for other purposes."

The invention consists in the introduction into the body, or on the surface, of paper, of a material imparting weight and substance to printing papers, and tending to render them more opaque, and also rendering the impression taken thereon more distinct. It adds weight and substance to brown papers, lightening and improving their colour, and also renders the ink more legible when they are written upon. It whitens cardboard, offers a good surface for drawing upon, and adds weight and substance. Ordinary paper stuff is taken after it is formed into sheets and immersed for two or three minutes in whiting or fine chalk dissolved or mixed in water to a creamy consistency; the chalk or whiting adheres to the paper or to the size or gluten of the paper; after which the superfluous chalky matter is washed from it in clear water, and the paper is dried and finished in the ordinary mode of manufacture; or a quantity of the whiting or fine chalk may be mixed with the paper pulp and the manufacture of the paper completed in the ordinary way; or, instead of mixing the chalk with the pulp, the whiting or chalk may be mixed first with the size or gluten and applied to the paper stuff.

[Printed, 4*d.* No Drawings.]

A.D. 1858, May 24.—No. 1157.

STEVENS, MONTAGUE.—"Improvements in machinery for pulping straw and other vegetable fibres."

"I employ a roller or cylinder with plates, plain or corrugated, screwed thereon at intervals, so as to leave between every two plates a groove or space; or I take a plain roller or cylinder with grooves along the breadth thereof, and I cause this roller to rotate in a bed composed of a semi-cylinder of a diameter and form corresponding with but a little

" larger than that of the roller. The roller is kept clear of
" the bed, and by means of shifting bearers, in which the
" axle of the roller revolves, the distance between the roller
" and the bed can be regulated as required. There is a cover
" to the pulper, and the fibre to be reduced to pulp is fed in
" between the roller and bed by an inclined shool, or between
" rollers placed over the main roller; the roller being made
" to rotate rapidly reduces the fibres to an even pulp by the
" rubbing action kept up upon them between the surfaces of
" the roller and bed."

[Printed, 6*d*. Drawings.]

A.D. 1858, May 26.—No. 1179.

LUIS, JOZÉ.—(*A communication.*)—"The application and use
" of the fibrous textile plant, called in Arabia, Diss, or in
" Latin, Arundo festuca patula, or by botanists, Festu coides
" et donax tenax, in the manufacture of pulp for paper, and
" tow for thread, tissues, and cordage."

This plant grows spontaneously in inexhaustible quantities in Algiers. The plant, when dried, is cut into lengths of fifteen to twenty inches. The pieces are then placed in a boiler and boiled for two hours in a mixture composed of 175 pints of soft water and two pounds of American potash; while wet, the mass is submitted to the action of pestles moved by machinery, which disengages the mucilaginous and herbaceous parts of the plant. All the time this operation is going on a current of fresh water is kept running over them in order to detach and carry away the mucilaginous parts, which must entirely disappear. After this trituration, the matter thus obtained is carefully sorted from all foreign substances; it is then put in a bath of fresh water for half an hour, after which it is taken out, dried, and stowed away ready for commerce. When it is required for paper, the tow is bleached in the same manner and with the same agents that other substances used for paper are. The following simpler process is substituted when the plant is not in so dry a state. The plant is steeped, just as it is, for fifteen days in a large vat or hole filled with water which is continually changing; during these fifteen days there is no occasion to move or touch it, and at the end of this time the water is drawn off, and, without any chemical agent being used, the separation of the fibres from the other parts is carried on in the same manner as above described.

[Printed, 4*d*. No Drawings.]

A.D. 1858, May 29.—No. 1217.

HENRY, Michael.—(*A communication from J. B. Vasseur and A. Houbigant.*)—"Improvements in, and in preparing "agents for, dyeing, preparing for dyeing, and tanning, and "applying certain of the resulting products for obtaining "pulp for paper and pasteboard, and the manufacture of "blacking."

The vegetable matters used are those containing resinous substances and tannin (such as gall nuts, sumac, female alder flowers, or others with like astringent and extractive principles); "vegetable substances containing resinous matters "but no tannin (such as hazel nut flowers, osier and walnut "peel, nettle roots, male alder flowers, and pear tree bark, "&c.); and vegetable matters containing a bitter and styptic "principle (such as gentian, lucern roots, and fodder plants) "treated with acids or chlorine. And I propose to treat "tannin agents or matters, such as tan, oak, bark, or sumac, "&c., with chlorine or with acids in order to free the materials tanned therewith from colour."

The fibrous and filamentous residue is to be used as pulp for paper and pasteboard.

[Printed, 4*d*. No Drawings.]

A.D. 1858, June 21.—No. 1400.

NEWTON, William Edward.—(*A communication.*)—"An "improved method of effecting the separation of the fibres of "wood for the manufacture of paper therefrom, which is also "applicable to the separation of the fibres of flax or other "substances for the manufacture of textile fabrics, and also "to the separation of other substances for similar or other "purposes."

The invention consists in subjecting the wood, in a strong cylinder or box, to the action of steam, air, gas, hot water, or other fluid, under a high pressure, for the purpose of charging its tubes, as well as the spaces between them, and then causing it to be suddenly projected from the cylinder or box into the atmosphere, or into a partial vacuum, where, by the expansive force acting within and upon the tubes, they will burst open and cause the complete separation of the fibres. The same process applies to the separation and opening of flax and other analogous fibrous materials.

[Printed, 6*d*. Drawings.]

A.D. 1858, June 22.—No. 1407.

GALLOWAY, William, and GALLOWAY, John.—"Im-
" provements in machinery for cutting, bruising, chipping and
" rasping, and otherwise treating or preparing dyewoods and
" roots or other vegetable substances."

The invention is adapted for cutting madder roots, "now " generally bruised or crushed under edge stones," and a variety of other vegetable substances. A vessel somewhat similar to a pug mill is fitted with knives, fixed across its diameter or nearly so, commencing within a few inches of the bottom, and repeated at intervals of a few inches, as far up the vessel as may be found necessary. Each story of knives is fixed at right angles, or at an angle to those beneath. A vertical spindle is mounted in the centre of the vessel, and carries cross knives of such length as to be nearly equal to the diameter of the vessel, and at such distances as just to clear, in revolving, the upper surface of the fixed knives.

The roots or other substances to be cut are put into the vessel, and in descending are cut by contact with the knives, and fall through an adjustable aperture in the bottom into a sifter of any of the various forms for such purposes; such portions as are not sufficiently cut pass out at the end of the sifter, and are again elevated into the top of the machine to go through again with the continued supply of fresh material, or after the material has been cut to a certain extent in this machine, it may be finished by bruising under the edge stones, millstones, or rollers.

In lieu of placing the machine vertically, it may be placed horizontally or obliquely, and it may be used for cutting rags, straw, or other grasses in preparation for pulp for paper making, and for other similar purposes.

[Printed, 6*d*. Drawings.]

A.D. 1858, July 1.—No. 1476.

WHITELEY, Thomas.—"Improvements in the manufacture "of millboard, and in machinery or apparatus for cutting "millboard and paper."

The invention consists in so arranging machinery for grinding and washing the various pulps, simultaneously and in juxtaposition, as to make the middle portion of the millboard of inferior or coarse material, and the outside of a finer quality and of a different colour as may be required, thereby saving the time required to dry the separate sheets, and also the cost of rolling, pasting, &c.

"Heretofore paper or pasteboard (resembling millboard) "has been made by first forming a millboard middle of coarse "or inferior pulps with the outsides of a finer quality, and "of different colours, but in the process of manufacture each "part when formed had to be dried and rolled, and then "pasted together."

"This part of my invention is performed by having several "washing and breaking or grinding engines arranged side by "side, or in such other relative position that they can be "worked simultaneously, in order that one or more of the "engines can be operating upon one quality or colour of "materials, whilst other engines are operating upon other "qualities or colours, the products thereof being conducted "to their respective 'pulp chests' and 'vats,' which are "placed side by side, or in such relative positions that one "workman or more can be forming or working the middle "layers of the pulp from coarse materials, whilst other "workmen are forming or making the outside layers of finer "qualities of pulp or of different colours, as may be required; "each man placing his layer of formed pulp in the proper "relative position on the same pile to form one millboard, "according to the thickness, quality, or variety of colour that "may be required.

"Secondly, this invention relates to machinery or apparatus "employed for cutting off the edges of millboard and paper "to form the proper size of sheets, and consists in the application of a straight edge knife, set or arranged so as to be "at an angle with the bed of the machine or press in which "the millboard is placed for cutting, and imparting to such

" knife a slide cut by means of a crank and connecting rod " with suitable guides for the knife."

[Printed, 1*s*. Drawings.]

A.D. 1858, July 14.—No. 1583.

CHAPUSOT, FRANÇOIS, and AVRIL, VICTOR.—(*Provisional protection only.*)—"Improvements in producing a more or " less perfect vacuum and applying the same to industrial " purposes."

Among other purposes "the manufacture of paper and the " drying of impressions" are mentioned. The invention is based on the "industrial application" of the vacuum of Torricelli, viz., the equilibrium existing in a barometric tube between the chamber and the column of liquid, making use of a larger barometric chamber or vessel, say of some cubic feet, and filling the same with water or other suitable liquid, then drawing off this liquid through a suitable outlet pipe with proper stock cock. The barometric vessel is made of sheet iron with cast-iron top and bottom, and the stop cock is so constructed as to allow of a very gradual opening of the pipe. An articulated hose is used for putting the vessel in communication with the matter to be acted upon by the vacuum, so that the entire operation consists in filling the barometric vessel with water or other suitable liquid, opening the stop cock to let off the liquid, turning the cock and closing the vessel in order to retain the vacuum formed, and finally bringing the latter by means of the hose into direct communication with the liquid matter to be acted upon, or with any other vessel in which it is wished to obtain a vacuum.

[Printed, 4*d*. No Drawings.]

A.D. 1858, July 17.—No. 1615.

WILDES, WILLIAM.—"An improved arrangement or arrange- " ments of machinery for reducing vegetable matter to pulp."

The invention consists in driving rolls or cylinders, through which the vegetable matter is passed to be converted into pulp, at different speeds; or in employing rolls or cylinders of unequal diameters, and driving them at the same speed, whereby a crushing and rubbing action will be exerted upon the fibres.

[Printed, 6*d*. Drawings.]

A.D. 1858, July 19.—No. 1628.

HERAPATH, William.—" Improvement in the manufacture " and treatment of paper with the view to the prevention of " forgery."

The invention consists in imbuing paper, during its manufacture or afterwards, with a solution of a ferro-cyanide, a ferrid-cyanide, or a sulpho-cyanide of potassium, sodium, or ammonium, for the purpose of preventing forgery. Common ink used on paper prepared with an excess of the ferro-cyanide, ferrid-cyanide, or sulpho-cyanide, will, upon being exposed to the action of acids and elements of an electro-negative character, be changed conspicuously from black to blue or red, according to the salt used, and with alkalies or electro-positives the ink will be changed to a brown red and will be partly obliterated, while the tint and texture of the paper will render the attempt to extract the ink perfectly visible. The proportions vary with the thickness of the paper, according to the solidity of the size, and to its being made with alum or alum cake.

[Printed, 4*d*. No Drawings.]

A.D. 1858, August 3.—No. 1757.

SHAW, John.—" A machine for the manufacture of paste-" board and cardboard."

The invention consists in uniting and compressing any number of sheets of paper by means of wooden or metal rollers, and glutinous or other adhesive substances, which substances are applied to the paper by the action of the machine, by which action the air between each sheet of paper is expressed while the same is being converted or manufactured into pasteboard or cardboard.

[Printed, 4*d*. No Drawings.]

A.D. 1858, August 5.—No. 1783.

McCRUMMEN, Donald.—" Improvements in the manufac-" ture or production of paper, which improvements are also

" applicable in the production of alkaline and other " salts."

This invention relates to the application, use, and treatment of marine plants, heaths or heather, and other vegetable productions, as well for the manufacture of paper as for the production of alkaline and other salts of a commercially valuable character. The plants are primarily cut into short lengths or slices, and the reduced or severed mass repeatedly washed in or exposed to the action of boiling water, with or without the aid of steam pressure. This treatment is pursued until the vegetable matters are completedly divested of saline properties. The vegetable matter or insoluble residuum is then boiled or otherwise treated with caustic soda, or a mixture of soda and lime, or with a mineral acid, for the purpose of disintegrating the fibres. The mass is then washed in pure water, and then dried in a stove, or otherwise, in order to prepare it for its final conversion into pulp as suited for paper makers.

[Printed, 4*d*. No Drawings.]

A.D. 1858, August 25.—No. 1929.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Husson Morel.*)—"Improvements in the treatment of vegetable " substances in order to convert the fibrous portions thereof " into pulp."

The invention consists in the means of separating the fibrous portions of vegetable substances from the resinous, gummy, and other substances which hold the fibres together, and in a particular means of bleaching the fibres. The operation takes place in a large vat with a perforated false bottom or grating, under which a perforated steam pipe connected with a boiler is supported. A safety valve is fitted in the cover of the vat and a draw-off cock at bottom. The vat is filled with bundles of diss and closed; steam is turned on, which on passing through a leading vessel placed between the boiler and the vat, and containing salts of soda or carbonate of soda, becomes impregnated with the same, and after a lapse of from twelve to twenty hours, more or less, will have discharged or softened the gummy and resinous matters in the plants. During the steaming the discharge cock must be opened at intervals, to allow of the escape of the condensed water, which will carry with it the gummy and glutinous matters extracted from the plants by the action of the steam. The steaming finished, steam is turned off from the vat, the cover removed, and a cloth thrown over the hot fibres at intervals; during one hour eau de javelle is poured in small quantities upon the cloth. The cloth is removed and a second applied, and for about a similar period water slightly acidulated is poured upon it; the fibres are washed and beaten in clear water. After being dried, either under pressure or otherwise, the fibres are fit for the manufacture of paper.

The diss or other vegetable substance is bleached, on leaving the steaming vat, by being placed in a pulping or tearing cylinder, and there thoroughly washed and the water run off. A solution of sulphuric acid is then poured in, marking eight or nine degrees with the water still remaining in the cylinder. The fibres are roused for about three-quarters of an hour and the water drained off, they are then washed in clear water, when a clear solution of crystals of soda is thrown in; the strength of the solution, after mixing with the water in the cylinder, should be from one half to two degrees. After stirring for about three-quarters of an hour, the water is run off, and a solution of chlorine poured in, which, when mixed with the contents of the cylinder, should mark from one-half to two degrees. The rousing is continued for about two hours, when the pulp will be found sufficiently bleached.

[Printed, 8*d*. Drawings.]

A.D. 1858, August 31.—No. 1981.

MARGESSON, PHILIP DAVIES.—"Improvements in treating "sugar canes and other canes containing saccharine matter in "the preparation of food for animals, also in manufacturing "sugar and worts or wash for brewing, distilling, and vinegar "making, and in applying the resulting fibre in the manu-"facture of paper."

The paper is to be made "by ordinary well known processes" from the resulting fibrous substances after extraction of the saccharine matters. The cane, as soon as ripe, is cut into thin slices or cuttings and then dried. It is then ground to a fine powder, and, thus powdered, is pressed into cakes for animals' food. After stating that the preparation or powder, before or after being subjected to pressure is applicable for the manufacture of sugar, or for the preparation of worts or wash for brewing, distilling, and vinegar making by dissolving out the saccharine matter therefrom, and then treating such solutions in the ordinary manner of sugar making, or refining, or by fermentation, to render such solutions suitable for brewing, distilling, and vinegar making, the inventor says, "The ground " vegetable fibre resulting from either of such processes is " suitable for paper making, and, in some cases, for the food " of animals."

[Printed, 4*d*. No Drawings.]

A.D. 1858, September 18.—No. 2106.

LUIS, José.—(*A communication.*)—" A new manner for ap" plying centrifugal force in the manufacture of the fecula of " potatoes, of starch, of yeast, of porcelain paste, of paper " pulp and ultramarine, and the apparatus for carrying out " the same."

On the interior mantle of the drum of the apparatus, the vertical mantle of which is of sheet iron perforated, a thickness of metallic coarse cloth or tissue of osier or wicker is applied. About and on this sheet iron is placed a tissue of linen, wool, or cotton, sufficiently fine to retain the fecula or starch which the water filters through.

The fecula having been washed, the water is, by means of a pipe and cock, run into the [drum of the centrifugal apparatus, which is made to revolve slowly and progressively until it is sufficiently full, the cock is then closed, and the drum made to revolve at its maximum velocity. From the effect of the centrifugal force, the fecula is deposited in circular layers on the tissue placed in the interior of the drum, at the same time that the water with which it was mixed escapes by the openings in the drum. At the end of eight or ten minutes velocity the fecula is sufficiently dry, so that it may be carried directly to the corestove or drying place without it being necessary to put it in kilns. By the same means waters charged with chlorine, acids, or alkalies, &c., can be made to pass through the fecula and other substances, hot water also, but not above a certain temperature for fecula or starch.

"In the manufacture of papers and beaver, when the pulp
" has undergone the necessary operation of bleaching, it is in-
" troduced in the drum in the form of a very fluid pulp; the
" apparatus is put in movement, and when the paste or pulp
" has formed a circular wall in the drum, a current of water is
" made to pass through it, in order to wash or whiten it.
" When the paste is sufficiently washed the water is stopped,
" and the process is finished in the same manner as with the
" fecula."

[Printed, 8*d*. No Drawings.]

A.D. 1858, October 7.—No. 2228.

SEYD, Ernest Julius, and **BREWER**, John William Northway.—(*Provisional protection only.*)—"An improvement in the preparation of paper to render writing thereon indelible."

The invention refers to preparing paper by applying to it an aqueous solution of ferro-cyanide of potassium. The writing in common ink, on paper so prepared, when dry, is indelible. The ferro-cyanide of potassium may be dissolved in distilled water, the strength of the solution varying with the nature of the application to be made therewith, and such solutions may be applied to the pulp in the manufacture of paper or to the ordinary manufactured paper. Other salts besides the ferro-cyanide of potassium may be similarly applied when acting in like manner on the ferruginous base of the writing ink.

[Printed, 4*d*. No. Drawings.]

A.D. 1858, October 28.—No. 2406.

HEYWOOD, Abel.—(*A communication.*)—"Improvements in machinery or apparatus for suspending paper and woven fabrics to be dried."

This invention is particularly applicable for suspending the paper used in making paper hangings. When the paper or fabric leaves the grounding, staining, or other machine, it is taken over a revolving roller which guides it to a pair of diagonal endless straps furnished with hooks, pegs, or projections to carry forward the lags or rods over which the paper or fabric passes; these lags or rods, with the paper or fabric suspended in loops from them, are deposited by the diagonal endless straps on to a pair of endless belts or ropes, which move horizontally, and gradually convey the loops of paper or fabric along the drying or other chamber in which they are suspended. The lags or rods, over which the paper or fabric passes, are selected from a suitable receptacle by a pair of hooks attached to the diagonal straps or by other suitable mechanism. In some cases intermediate endless belts or ropes may be used to convey the lags or rods from the diagonal straps to the horizontal endless belts or ropes. By this means the paper or fabric is carried away from the machine and suspended in the room where it is dried, thereby effecting a considerable saving in labour.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1858, November 3.—No. 2457.

MAWDSLEY, Peter Alfred.—" The use and application of " a certain substance or substances in the manufacture, stif- " fening, or sizing of paper."

The invention consists in employing for the sizing of paper alkaline substances, such as the aluminate of potash and the aluminate of soda. The aluminate of soda may be prepared in the following manner :—Take equal parts of alumina and any of the carbonates of soda, and fuse them together in a reverberatory furnace until the materials are thoroughly incorporated by fusion. The alumina, during the process of fusion, expels the carbonic acid from the carbonate of soda, and the product left will be a white hard substance, readily soluble in water. The aluminate of potash is prepared in a similar manner, potash being substituted for soda. The aluminates are then dissolved in either hot or cold water, and afterwards concentrated by evaporation to the requisite consistency. They may be applied either to the pulp or to the paper itself.

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 8.—No. 2493.

ALCAN, Emile.—(*A communication.*)—" An improved " method of treating or preparing materials to be manufac- " tured into paper, applicable to lie washings in general."

"By my improved method of operating, the lye washing or "other opening out liquid penetrates instantly, and spontaneously to all parts of the materials to be operated upon," namely, straw, alpha, or other vegetable substance, used in the manufacture of paper; "for this purpose, instead of "placing the materials to be operated upon in open vessels "exposed to the pressure of the atmosphere, I enclose them "in a vessel the upper surface of which is closed from the "atmosphere, but communicating below with the vessel "containing the alkaline lye or other opening out liquid, "which is exposed to the pressure of the atmosphere or of "steam. In the close vessel I establish a vacuum by the "condensation of steam," "the alkaline lye is admitted and "penetrates spontaneously and thoroughly the materials to "be operated upon in the first vessel. The operation may "be repeated several times, and prolonged as much as "necessary, the repetition of the operation and the duration "of it varying with the greater or less resistance of the "material operated upon."

[Printed, 10*d*. Drawings.]

A.D. 1858, November 9.—No. 2505.

JULLION, John Louis.—"Improvements in the manufacture "of paper."

The invention, which has for its object to fill up the interstices of the fabric, and render the paper hard and compact, consists in employing for the above purposes precipitated sulphate of lime or precipitated silicate of lime, either separately or together, or a combination of either or both of the above, with oxychloride of zinc, or oxide and chloride of zinc together, with feculent or glutinous substances, the above materials being either added to the prepared paper pulp, or used in combination with the gelatine or other size employed in the process of sizing the paper.

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 18.—No. 2609.

RIDER, Benjamin.—"Improvements in ventilating hats and "caps, and in the preparation or manufacture of the material "of which those articles are made."

The first part of the invention relates to the ventilation of hats and caps. "The second part of the invention relates to "the manufacture or preparation of material for the bodies "and other parts of hats or caps. It consists in combining "with the paper, while in a state of pulp, long fibres of any "fibrous material, or fibres or threads of cork, or cork pulverized, prepared for the purpose, which imparts lightness "and stiffness to hat and other bodies, or other parts of hats "or caps when made. Instead of introducing fibrous material, "I sometimes form a stringy, fibrous-like structure in the "body of the paper by introducing ale or other malt liquor "with the pulp, mixed with a little oil. This malt liquor and "oil combines with the size in the paper and forms a fibrous "and web-like structure. It may be necessary to add additional size for the purpose."

[Printed, 6*d*. Drawings.]

A.D. 1858, November 19.—No. 2612.

HAYWARD, WILLIAM STEPHENS. — "Improvements in the "manufacture of a glutinous and viscous substance or dextrine "to be used in the manufacture of paper and in dressing "textile fabrics, by which greater tenaciousness, smoothness "of surface, and body is obtained."

The substance made use of to produce the dextrine is starch or starchy matters, obtained from potatoes, grain, or any of the leguminous plants. The starch is first subjected to the action of a weak solution of nitric or nitro-sulphuric acid, the latter being sprinkled over it; the strength of this solution will vary and depend upon the quality of the starch used; generally a useful preparation will be one of acid to twenty-five of water, and the quantity of solution used may be about an eighth or a tenth of the mass of starch operated on. The whole mass is then subjected to the action of heat until the liquor is evaporated, and until a change begins to take place in the colour of the resulting product. It is then removed and ground to a powder. It is now in a state ready to be applied to the purposes before specified. The mode of using, when it has to be applied to the paper, is as follows:—The powder last mentioned, which resembles in appearance and possesses the properties of a gum, is mixed with two, three, or four times its weight of water, so as partially to dissolve it, forming a clear viscous or gummy mixture.

If this mixture is to be used for fine white paper it is carefully strained; if for coarser or darker papers less nicety is required. In this state it may be mixed with the paper pulp in the pulp chest in proportion of one part of gummy substance to three or more of the pulp.

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 24.—No. 2668.

PETERSON, Charles.—"Improvements in the manufacture " of paper cartridges, and in papers applicable for waterproof " purposes."

The cartridges may either be made in their complete form at once from the pulp, or the pulp may be first reduced to the form of paper sheets, and afterwards made into cartridges. A solution of soap is introduced into, and intimately mixed with, the paper pulp; alum in solution is then added, and this, combining with and decomposing the soap, produces an insoluble substance which extends throughout the body of the papers or cartridges when made, and renders them waterproof.

"Papers for other purposes in which they are required to " be waterproof I manufacture in the same manner."

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 25.—No. 2672.

CALVERT, Frederick Crace, and **LOWE**, Charles.—"Im" provements in the manufacture of size."

The invention consists in the application of caustic alkalies for the purpose of dissolving the gluten or proteine matter contained in the flour and amylaceous substance employed in the manufacture of size, such gluten or proteine matter in its undissolved state being injurious to the free working of the size, and causing the destruction, during its fermentation, of a considerable amount of flour and amylaceous substances used.

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 27.—No. 2694.

SPRATT, James.—(*Provisional protection only.*)—"Improvements in the manufacture and strengthening of "paper."

This invention consists in combining yarn threads, or similar material, with paper pulp, for the purpose of adding strength to the paper. In coarse paper, wire is applied instead of thread or yarn, the wirebeing passed through between the rollers with the sheet of paper pulp, and becoming embedded in and combining therewith, so as to form a smooth uniform surface. The wires, threads, or fibres may be disposed simply in straight lines parallel to the length of the paper, or such material may be disposed on the sheet of paper in a zig-zag or in any other form or device suitable for imparting strength, and it may, if coloured, be rendered ornamental.

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 29.—No. 2715.

LEA, John, and SHERRING, William Alexander.—(*Provisional protection only.*)—"Improvements in the treatment "of vegetable fibres for the manufacture of paper, spinning, "and other purposes."

The invention relates primarily to the treatment of manilla, jute, and other stubborn fibres, but is applicable to vegetable fibres of every description. It consists in subjecting such fibres, after they have been boiled in a solution of caustic alkali, soda, potash, or other suitable solution, and before they are bleached, to the action of a solution of chloride of lime or its chemical equivalent, and of acids containing sulphur or chlorine with or without the addition of soda. It consists, secondly, in subjecting the fibres, if intended for paper making, after they have been treated with the solution before described, to the action of a beating or other engine, and at the same time to the action of a solution of caustic soda or potash, or other alkaline solution. The alkali is then well washed from the fibres, and the ordinary bleaching process is proceeded with.

[Printed, 4*d*. No Drawings.]

A.D. 1858, December 4.—No. 2781.

YATES, Henry Thomas.—"Improvements in the manufac-
" ture of boards or sheets when wood sawdust is used."

Wood sawdust is sifted into several degrees of fineness, the finer qualities being used for making the thinner sheets or boards. A quantity of resin, in the state of powder, generally about one-eighth of the weight thereof, is intimately mixed with the sawdust. In some cases, particularly for the coarser articles, powdered pitch is employed instead of the resin. A heated metal plate is used, on which a sheet of paper or woven fabric is placed; then a frame or mould, according to the size and thickness of the intended sheet or board which is to be produced, is placed on the paper. This mould or frame is filled with the composition of wood sawdust and resin or pitch; then when the mould or frame has been lifted off, another sheet of paper or woven fabric is placed on the composition, then a hot metal plate; and in this manner numerous layers of the composition are placed within a powerful press and subjected to pressure till set. These boards or sheets are suitable for use, in place of paste and other board, for packing and other purposes.

[Printed, 4*d*. No Drawings.]

A.D. 1858, December 16.—No. 2889.

WHITE, William, and PARLBY, Josiah. —(*Provisional protection only.*)—" Improvements in the preparation or treat-
" ment of 'carton pierre' and such like composition, and in
" the application thereof to the coating or covering of walls
" and other surfaces."

This invention consists in mixing with the above material matters adapted to resist moisture, such as pitch, tar, resin, gutta percha, india-rubber, or resinous or bituminous substances of a like nature, or of cement in powder.

[Printed, 4*d*. No Drawings.]

1859.

A.D. 1859, January 19.—No. 160.

SPARRE, Pehr Ambjörn.—"Improvements in the manu-"facture of paper suitable for bank notes, cheques, bills, and "similar articles."

The invention has for its object the application to the paper in the course of manufacture of a material capable of producing therein an opaque body, either white or in one or more colours, and of any required pattern or design, which opaque body will not interfere with the clearness of the printing on the surface of the paper, but will become visible so as to appear mixed up with the subject of such printing when the note, cheque, bill, or other similar article is held up to the light. This opaque body consists of a powder not soluble in water, such, for instance, as that of Prussian blue, red lead, white lead, &c.; and such opaque body, is intended to be so applied to the paper, either alone or in combination with the common water-mark, that the smoothness of the surface of the paper is preserved so as not in any degree to impair other typographic or lithographic printing thereon. The application of the opaque body is effected by means of a metal plate or sheet perforated according to the required pattern or design, after the manner of a stencil plate, except that the plate or sheet is much thinner than is ordinarily used for this purpose, and the opaque material or colour is brushed over the plate so as to pass through the perforations, and become deposited on the paper behind the plate or sheet, after the ordinary mode of stencilling. The opaque body is thus applied when the first layer is couched. The stencil plate is then applied to the layer thus couched, and united thereto, if necessary, by the aid of an exhaust; the opaque material is then brushed over the plate, which is afterwards removed from the layer, when another layer is couched over the former one, and the further process of completing the paper is carried on as usual.

[Printed, *4d.* No Drawings.]

A.D. 1859, January 24.—No. 214.

SMITH, John, and SMITH, William Henry.—"Im-"provements in manufacturing paper and in producing "water-marks, patterns, figures, letters, and devices there-"on, and in the construction of the mechanism employed "therein."

The invention consists in the use of an improved dandy roller or mould constructed by boring a cylinder of metal from end to end perfectly true and clean, and this being ribbed or fluted through from end to end, with bars left standing, is fixed on a suitable mandril and turned true. It is then ribbed and fluted from end to end, leaving bars standing, regulating the distances as required, crossing the surface at right angles, or nearly so. The cylinder is then placed on a suitable mandril, turned true and reduced. The groundwork is then, by means of tools or cutters, worked like a screw from end to end "one line or "more out in the pitch (if a spiral roller), if not spiral the "lines may be cut in single one at a time by a dividing appa-"ratus, and spaces may be left in places to make 'lined' "paper if desired. By the proper arrangement of depths it "is obvious that the metal will be cut through to the surface "of the bars, and thus leave a perfect piece of perforation. "When not spiral, we must reverse the means employed; "for instance, the roller may be turned or ribbed inside in "circles from end to end, leaving spaces between them, or "they may be cut in like the pitch of a screw, and upon the "outer surface it is crossed at right angles or in other manner, "so that the inner bars may cross the outer surface lines either "perpendicularly, diagonal, or otherwise."

"For paper-making moulds we take a suitable piece of flat "metal, and surface it, then cut bars in the back, and cut the "'laying' in manner and form required, as herein-before inti-"mated with regard to the rollers. We also employ deckles "made of metal instead of wood, as heretofore used; we next "proceed, if required, to put patterns, figures, letters, and "devices on the surface of the roller or mould, this we do by "cutting or engraving in or upon the surface, as required. It "is evident that the 'marking,' so called, would leave just the "reverse effect to that in general use (which are raised, thin-"ning the paper at that part where the impression is), whilst

" the improved patterns, &c., are lighter when looked at down, " or when held up to the light, darker.

" Should it be required to produce at one and the same time " lighter portions of the watermark or lines raised above the " level of the surface of the dandy roller or mould similar to " the old process, we employ 'marking,' which we produce by " cutting out by pressure rollers the required patterns, &c., " in thin metal or other suitable material, which pattern is " then attached to the surface of the roller or mould, or we " transfer the pattern, &c., by the pressure of a hardened steel " roller upon the surface of the dandy roller or mould, and " afterwards cut the roller or mould at the back to produce " the requisite perforations. But it is obvious that we can " adopt various methods of producing the patterns, figures, " and devices required. We also produce the requisite patterns, " figures, letters, or devices, by means of two dandy rollers, " one of which may be an improved dandy roller, or any " ordinary dandy roller, either laid or wove, and the other a " roller, either perforated or not, according to circumstances, " with the necessary pattern, figures, letters, or devices, thereon, the two rollers being caused to act in conjunction, so as " to produce the desired effect. We can have the patterns, " &c., on rollers or moulds for paper-making made moveable, " which we effect by having types somewhat similar to printers' " types, and these are to be properly fitted on the surface of " skeleton or other rollers acting in conjunction with the " dandy roller as above referred to."

[Printed, 8*d*. Drawings.]

A.D. 1859, January 27.—No. 253.

CROWTHER, William.—" Improvements in the manufacture " of prussiates of potash or soda, and in recovering a useful " material therefrom."

These are, in reference to this subject, in manufacturing "prussiates of potash or soda from woollen and " other such manufacturing material, in which cotton or " other vegetable fibrous substances may be mixed," treating the mixed material with a hot solution of alkali until the animal matter becomes dissolved, "leaving the cotton or " other vegetable substance in a solid form, this having been

" allowed to settle the clear liquor is ran off " and treated for prussiates. " The cotton or other vegetable substance remains " therefore in a separated state, and may be washed and ap- " plied to paper making and other manufacturing purposes."

[Printed, 4*d*. No Drawings.]

A.D. 1859, January 28.—No. 262.

WATSON, Henry.—" Improvements in the manufacture of " knotter plates used in the manufacture of paper."

The invention consists in applying, by the aid of machinery, a circular saw on the reverse side to that on which the plate is first cut or grooved so deep as to leave sufficient thickness of plate uncut to form a good edge for wear.

" I would state that I am aware that circular saws have been " used before for cutting the grooves in knotter plates, but " only from the grooved or open side. The peculiarity of my " method is of employing a circular saw in the arranging the " same to cut from the reverse or smooth side of the plate."

[Printed, 8*d*. Drawings.]

A.D. 1859, February 3.—No. 310.

JENNINGS, Henry Constantine.—" Improvements in the " manufacture of paper and artificial parchment, and of gela- " tine applicable to the sizing of the same, and other pur- " poses.

1. Manufacture of paper from the fibrous parts of fishes, which material may be employed either alone or mixed with the pulp manufactured in the ordinary manner from vegetable substances. For this purpose the fish is covered with hydrated or slaked lime mixed with water to the consistency of cream, and brought to the temperature of about 100° to 120° Fahrenheit. In this mixture it is kept from twelve to twenty-four hours, according to the thickness and size of the fish employed. After the fish has been digested with the lime, caustic soda, or potash, it is mashed up in soft water to remove the lime and bring the mass into such a state that the skin and bones can be easily separated and removed. The fish is then to be brought into a pulp, and immersed in a cold solution of hyposulphate of soda, common salt, and alum. When the fish has

been for some hours macerated in this solution, the liquor is drawn off, and a solution of alum, nitric acid, and sulphurous acid is substituted for it. After a further maceration in the acid liquid, the fish fibre must be drained and pressed to remove as much as possible of the acid and water. Lastly, it is treated with a solution of bichloride of mercury (corrosive sublimate) and alum.

The second part of the invention relates to the production from fish of a kind of gelatine or size applicable to the sizing of paper. The fish is boiled in a weak solution of nitric acid, and when partially dissolved a certain quantity of sulphuric acid is added. The operation of the acids is best conducted in a close vessel under a slight pressure, say 6 or 8 lbs. to the square inch. When the fish is sufficiently dissolved the liquid is strained hot. After it has become cold, it is treated with oxalic or sulphurous acids, for the purpose of depriving it more or less completely of colour. After this it is caused to evaporate to such a consistency that it will set or become solid upon cooling to the temperature of the air. The operation is best carried on in vacuo, as it is desirable that it should be effected at as low a temperature as possible.

[Printed, 4*d*. No Drawings.]

A.D. 1859, February 3.—No. 311.

PETRIE, John, junior, and **WRIGLEY**, Thomas.—"Improve-
" ments in machinery or apparatus for washing rags and other
" materials for the manufacture of paper."

The rags, &c., are delivered to the machine by a travelling apron, and submerged by a revolving or reciprocating plunger. They are then agitated in the fluid and caused to move onwards by rakes, after which they are lifted by a revolving drum furnished with arms or teeth, and delivered on to a travelling apron, which conveys them to squeezing rollers. The vessel in which these operations are performed is furnished with a perforated false bottom, through which dirt and other foreign matters pass. The lifting drum we construct with cams or other apparatus, whereby the arms or teeth are drawn inward, so as to leave the material free to fall upon the apron.

[Printed, 10d. Drawings.]

A.D. 1859, February 8.—No. 348.

MOSS, THOMAS.—"Improvements in the manufacture of "paper and printing ink suitable for bank notes, bills of exchange, and other documents requiring like security against "being copied."

For these purposes colouring matter is combined with the pulp, such colours being prepared from burned china or other clay, oxide of chromium or sulphur, so that the paper when made will have diffused through it one or more of such substances; or these matters or some of them may, without other colouring matter, be combined with the pulp, and the paper made therefrom may afterwards be stained or dyed, or printed with any desired colour.

Printed, *4d.* No Drawings.]

A.D. 1859, February 11.—No. 386.

BRUCE, HENRY.—"Improvements in apparatus for the "manufacture of paper."

The invention consist in manufacturing paper, so that the web as it leaves the paper-making or air-drying machine is coated with a mixture, in which way papers of every shade of colour may be made, and the web may be coated upon one or both sides; it is then dried and subjected to the glazing process, which produces an enamelled paper.

When the mixture is laid on, the paper passes between a series of heaters for drying the web. The heaters consist of a series of hollow receivers, through which a current of steam or heated air is caused to pass; the drying of the paper is completed by passing it round a cylinder or cylinders. From the cylinders the paper passes over two tension rollers, and is then subjected to the action of glazing rollers or brushes, to which a rotary or lateral or lateral and rotary movement is imparted. The glazing operation may be assisted by using, in combination with the mechanical arrangement of glazing rollers or brushes, powdered French chalk, or some such material, which is rubbed upon the paper by the roller or brushes to impart thereto a smooth glossy finish or enamel, if required. The glazing rollers or brushes are arranged in pairs or series one above the other, so as to glaze both sides of the paper at one operation, and, if necessary, heating or drying apparatus may be arranged between the rollers or brushes, and used in conjunction therewith. Or, instead of using rollers or rotary brushes for glazing or polishing the paper, flat, round, or hollowed surfaces may be employed, to which an eccentric or elliptical motion is imparted. By employing an arrangement of suitable rollers or colour holders, ornamental or decorative devices may be printed on the surface of the paper, either before or after the glazing operation is effected.

[Printed, 2*s.* 10*d.* Drawings.]

A.D. 1859, March 1.—No. 545.

LICHTENSTADT, DAVID.—"Converting certain vegetable "substances into fibrous material for the manufacture of "paper, textile and other fabrics."

The invention relates to plants of the *genus* bambusa and bambusa arundinacea. The knots or joints are cut away from the plants, and the pieces which have been severed from the knots are put in bundles into a boiling caustic solution, which is forced into the pores of the material by steam or other pressure. When taken out, the bundles are pressed and broken up between rollers, and brought out flattened fibrous material. The material is then washed in dilute sulphuric acid, or other suitable acid, and the whole again boiled in a saponaceous solution, in order to liberate the fibrous material from all vegetable glue and albumen. It may then be washed in clean hot water, and be treated in the usual way of treating fibrous material for manufacturing paper. The knots may be treated separately for the production of an inferior article useful for various purposes. The plant, if old and very strong, is divided as before described, and left in a caustic lime solution for several weeks, according to age, after which the material is treated in the before-mentioned manner, "and this "material is more suitable for paper making and such like "purposes."

[Printed, 4*d.* No Drawings.]

A.D. 1859, March 2.—No. 550.

COLLYER, ROBERT HANHAM.—"A process of preparing "materials for the manufacture of paper, and a machine

" employed therein, which machine is applicable for crushing, " grinding, bruising, and reducing various substances."

The invention relates to an improved method of treating flax, straw, and other matters, to prepare them for the manufacture of paper. These materials are first soaked or boiled in water sufficiently to soften them, and then subjected to the action of the machine, which opens and breaks it, destroying the knots, ears, boon, &c., crushing its siliceous cortex, &c., and thereby preparing it for the action of caustic alkali, in which it is next boiled sufficiently to dissolve the silica, and after it has been freed from the alkali by washing, it is bleached by being steeped in a solution of chloride of lime, and treated with carbonate of lime, to which sulphuric acid is added. But when its albumino-mucilaginous properties are to be preserved, it is boiled in an alkaline carbonate instead of a caustic alkali.

The machine used for the purpose, and which is applicable for crushing, bruising, grinding, and reducing paints, drugs, and various substances, consists of an apparatus in which a roller, drum, or cylinder is employed having two flanges on its external periphery, one to each side, between which flanges are two or more smaller rollers so geared as to have an accelerated motion, and thereby produce a triturating action. These smaller rollers (the first part of which may be fluted) are so arranged consecutively in a direction round the periphery of the large drum, that the flax, straw, or other matter in passing under them may be always in contact with the periphery of the large drum.

When the machine is employed for operating on rags, rope, flax, or other fibrous or similar matter, a roller with cutters or knives is added to the machine.

The flanges on the large drum may be toothed, so as to drive the smaller rollers, which may be kept down by screws, levers, weights, or otherwise.

[Printed, 8*d*. Drawings.]

A.D. 1859, March 2.—No. 554.

ROCHE, ETIENNE.—" Improvements in the manufacture of " paper suitable for forming cigarettes, and for other purposes, " and also improvements in the manufacture of cigars."

The invention consists, among other things, in the application of the leaves of the tobacco plant, or the ribs of the leaves, or their juice, to the manufacture of paper. For this purpose the leaves or the ribs of leaves are beat in their juice by means of rollers in the ordinary way of making pulp. If the pulp is not sufficiently fibrous, from 5 to 50 per cent. of rag beaten in tobacco juice, or glycerine, or gluten is added. The pulp is then passed through a series of rollers, which consolidates the matter and forms it into a sheet of the thickness desired. Paper manufactured in the above manner is applicable for making cigarettes, and for other uses, such as wrappers for packages of wools, furs, and other articles, as, on account of its natural smell, it keeps off insects.

[Printed, 4*d*. No Drawings.]

A.D. 1859, March 19.—No. 698.

STEIN, SAMUEL.—(*A communication from Auguste Marie Chevalier.*)—(*Provisional protection only.*)—"Manufactur-
"ing a resinous carton or pasteboard from vegetable matter;
"an improvement for roofing, ship sheathing, lining walls
"to prevent dampness, and other uses."

1. To compose a homogeneous carton or resin pasteboard free from all earthy substance, it is necessary to employ vegetable matter that has passed two or three times through the grinding mill. 2. This vegetable matter must be dried at a heat of about 50° before passing through the rollers of the mill. 3. When the carton is thoroughly dried, it is plunged into a tub containing a dissolution of the resinous mixture just below the boiling point, and kept there from two to ten minutes, according to its thickness, or the time necessary for impregnating fully every atom of the carton with the resinous liquor. 4. Immediately on withdrawing the carton from this dissolution, it is placed to drip in a small close stove the temperature of which must be kept up to the same degree of heat as the liquid from which it has been withdrawn. 5. After the carton has thoroughly dripped, it must be placed in a vaulted stove, built with safety valves or air holes, and well bound with iron hoops, the shutters and doors of which must be also made of iron. The carton must remain in this stove till the volatile oils arising from the resinous mixture have been completely evaporated. 6. After this, the carton must be placed perfectly

hot between two metallic plates of zinc or other metal, and passed through strong rollers in order to give it a finish. 7. After receiving this finish, the carton must be exposed to the free action of the atmosphere until such time as it is considered ready for being employed.

[Printed, 4*d*. No Drawings.]

A.D. 1859, March 19.—No. 701.

HAIGH, William.—(*Provisional protection only.*)—"An "improved manufacture of paper to be employed for the "purposes of packing and other similar uses."

The improvement consists in the interposition of a layer or layers of any textile fabric or material between two or more thicknesses of paper or cardboard, which is to be secured in its position by means of paste or other adhesive substance, and subjected to pressure from rollers or other equivalent means so as to be thoroughly incorporated in the interior or body of the paper, which is thereby prevented from cracking or bursting when bent into any required form, and rendered much more durable and tough.

[Printed, 4*d*. No Drawings.]

A.D. 1859, March 21.—No. 707.

HAGGETT, William.—"An improved method of treating "metals and other materials to increase their strength."

This invention consists in giving to iron and other materials, by rolling, pressing, or casting, an undulated surface, composed of longitudinal and transverse corrugations, crossing each other at right angles, or diagonally at such other angles as may be most advantageous for the purpose to which the prepared article is to be applied. This method of increasing strength is applicable to "all metals, wood, "cardboard, paper mâchee, clay, and all other materials "capable of being rolled, pressed, cast, or moulded;" and the materials so strengthened are applicable, either separately or in combination, to a great variety of purposes, amongst others to ship and boat building and sheathing, railway and tramroad works, canal locks and aqueducts, railway and other carriages and engines, steam and other boilers, hydraulic and other works, tanks, cisterns, pipes, chain cables, and other chains, &c.

[Printed, 6*d*. Drawing.]

A.D. 1859, March 23.—No. 739.

EVANS, John. — "Improvements in the manufacture of "paper."

The object of this invention is to glaze or polish webs of paper by means of a burnishing process, instead of rolling it between metallic, glazed, or polished plates, or calendering it in the ordinary manner. The invention applies mainly to the treatment of writing papers, and the advantages proposed are a better finish, with an economy of cost both in machinery and wages of workmen, while at the same time wider webs of paper can be operated upon than it was heretofore advisable to submit to the calendering process. The burnishing is effected by bringing the paper into contact with one or more polished rolls or sets of polished rolls driven rapidly as compared with the surface speed of the paper under treatment, and by independent gearing, the paper being supported and held during the burnishing process by other hard and polished rolls, "instead of as heretofore resting upon rolls constructed of "wood or paper."

[Printed, 10*d*. Drawings.]

A.D. 1859, March 29.—No. 787.

TAYLOR, Thomas.— "Improved means of giving increased "strength to paper."

By this invention paper acquires, "to a greater or lesser "degree, the toughness, semi-transparency, and general appearance of parchment." It consists in soaking the paper, either during its manufacture or in its finished state, in a concentrated solution of chloride of zinc, or chloride of tin, or the chlorides of calcium or magnesium, either alone or mixed with each or any of the others in varying proportions according to the effect desired. After the soaking, the paper or pulp is to be thoroughly washed in water, and, if necessary, in a weak alkaline solution. The paper may then be dried and submitted to the ordinary processes for obtaining a smooth or glazed surface, and in the case of pulp it may be manufactured into paper in the ordinary way.

[Printed, 4d. No Drawings.]

A.D. 1859, April 6.—No. 861.

BALLANDE, JEAN AUGUSTE HILARION.—(*Provisional protection only.*)—"An improvement in the preparation of writing "paper and ink to be used thereon."

The invention consists in introducing into paper, either during or after its manufacture, oxides or metallic salts, the proportions of which may vary according to the intensity of effect to be produced. Proto-chloride of mercury is the best adapted, but any salt of iron or copper, or indeed any other metallic salt, will answer the purposes of the invention.

A colourless and odourless ink, producing dark grey characters, which in a few days become dark green, is made of gum water 1000 parts; prussiate of soda or potash 25 parts; and hydrosulphite of soda 25 parts.

[Printed, 4*d*. No Drawings.]

A.D. 1859, April 16.—No. 957.

NEWTON, WILLIAM EDWARD. — (*A communication from Mr. Le Chatelier.*)— "Improvements in the manufacture of "alumina."

These are, in reference to this subject, preparing alumina by the following processes, "which may be applied to "various useful purposes in the arts,"; and among others named, to "the preparation of paper pulp." Precipitating alumina "from its solutions in alkalies in the state of aluminate "of soda or potash." "1st, by the action of carbonic acid "gas," either "in a horizontal cylinder provided with an "agitator," or "in a tower arranged in such a manner as to "divide the solution as it falls." 2nd, by bicarbonate of soda. 3rd, by carbonate or bicarbonate of ammonia. "4th, by the "formation of an aluminate supersaturated with alumina, "and the spontaneous separation of a portion of the alumina "by settling." 5th, by adding acid "in quantity equivalent "to the soda of the aluminate, and more especially muriatic "(hydrochloric) acid, as this aluminate may be employed for "the condensation of the last vapors of muriatic acid in the "manufacture of that acid." "6th, by the treatment of the "alkaline carbonate in solution by a solution of hydrochlorate "of ammonia or of chloride of calcium, &c. 7th, by the "treatment of the alkaline aluminate in solution with chloride

" of aluminium, the result being the double precipitation of " the alumina of the aluminate, and also that of the chloride." 8th, "by the employment of any other substances having the " property of precipitating alumina from its solutions in alkalies." The alumina is purified from iron, &c.

[Printed, 6*d*. No Drawings.]

A.D. 1859, April 28.—No. 1070.

LARDENOIS, Eugene.—(*A communication from Bonnet Frederic Brunel.*)—"Improvements in the manufacture of " pulp for paper, pasteboard, and other like articles."

The invention consists in manufacturing pulp from vegetable substances, without rags, by subjecting them.—1. To the action of steam. 2. To the blows of heavy hammers and pressure between rollers. 3. To solutions of protoxide of sodium under pressure. 4. To mineral acids and to washings in water. 5. To chlorine or chlorides, to carbonic acid, to oxalic acid, to heat, to galvanic currents, and to pressure.

Peculiar construction of a vessel designated the "Electro-" chlorigene," employed in the manufacture of the above.

[Printed, 4*d*. No Drawings.]

A.D. 1859, June 7.—No. 1390.

BARCLAY, Robert.—"Improvements in the manufacture of " paper from which writing or other inks cannot be expunged " or extracted without detection."

"*Method No.* 1.—I incorporate in the substance of the paper, " during the process of manufacture, the soluble and insoluble " ferro-cyanides, ferrid-cyanides, and sulpho-cyanides of tin, " bismuth, zinc, copper, lead, nickel, chromium, antimony, " aluminium, tungsten, barium, strontium, magnesium, and " calcium, either as salts with single bases, or as salts with " more than a single base, or as salts having in addition to " one or more bases, potassium, sodium, or ammonium, as " additional bases. In conjunction with any of the above-" named substances, I incorporate" "during the process " of manufacture, any vegetable or animal colouring matter, " or metallic colour, or any insoluble or soluble salt of man-" *ganese, nickel,* or *lead*, which is not deliquescent, and does

" not contain ferro-cyanogen, and which is turned a diverse " tint, or whose colour is destroyed by alkalies, alkaline salts, " chlorine, or bromine, or their compounds.

" *Method No.* 2.—I incorporate in the substance of the " paper, during the process of manufacture, any soluble salt " (which is not deliquescent), or any insoluble (not containing " ferro-cyanogen) of manganese, lead, or nickel, in conjunction " with any animal or vegetable colouring matter or metallic " colour whose tint is changed or destroyed by acids or " acidulous salts or alkaline salts.

" *Method No.* 3.—I incorporate in the substance of the " paper, during the process of manufacture, the ferro-cyanides, " ferrid-cyanides, and sulpho-cyanides of potassium, sodium, " and ammonium, in conjunction with any insoluble salt of " manganese, lead, or nickel, or any animal or vegetable " colouring matter or metallic colour whose tint is destroyed " or turned a diverse colour by alkalies, alkaline salts, chlorine, " bromine, or their compounds.

" *Method No.* 4.—I incorporate in the substance of the " paper, during the process of manufacture, the insoluble " ferro or ferrid-cyanide of manganese or the soluble sulpho-" cyanide of manganese, either as single salts or combined " with potassium, sodium, or ammonium, as salts with double " bases, for example, the ferro-cyanide of manganese and " potassium is such a salt with a double base.

" The substances above mentioned, which are insoluble, I " incorporate in the paper pulp in the beating engine of the " paper maker, while those which are soluble I dissolve in the " size in the process of sizing; and as most of the substances " specified, when incorporated in the paper, are changed and " altered in colour when sized by the method usually adopted " by paper makers of dissolving potash alum in the animal " and vegetable size used, and as this change of colour is a " great obstruction to its use for many purposes to which the " papers are applicable, and renders the stain produced by " ink-discharging chemicals when applied to the papers less " evident in sizing papers prepared by either of the methods " above described; to avoid this change as much as possible " I size the paper in a continuous sheet and then dry it by " means of sizing and drying machines, such as are now " *frequently* used by paper makers." "With the same

" object in view, of preventing the extraction of inks from " paper, I apply printers' inks, and other materials attached " to the surface of paper. In this case I use the substances " mentioned in the four specified methods of making the " indelible papers."

[Printed, 4*d*. No Drawings.]

A.D. 1859, June 18.—No. 1468.

COX, JAMES.—" Improvements in machinery or apparatus " for cutting rags for paper makers."

The invention consists in the employment of two sets of any convenient number of cutters placed upon two shafts, and driven at different velocities, the cutters being so arranged as to work into one another with a scissors-like action. The rags or other materials may be supplied to the cutters from the top, so as to fall between the cutting edges, which immediately cut the rags or other materials into pieces or strips the size of the spaces left between each pair of cutters. The cutters are protected by means of shields or guards, so that the persons feeding the cutters are not exposed to the risk of accidents. If necessary, an arrangement may be adopted for a continuous pressing of the rags or other materials into their proper position. The cutters are strengthened by a collar or disc on each side of them, also revolving with the cutter shafts; and these shafts are so arranged as to enable the cutters to be adjusted as may be required.

[Printed, 10*d*. Drawings.]

A.D. 1859, June 27.—No. 1537.

LEIGH, THOMAS.—" An improvement in paper making machinery."

The invention relates to a novel mode of cleansing the felts of paper machines. " Hitherto it has been necessary from " time to time to stop the machine, and by means of beaters " and a free application of soap and water to rid the felt of " the size which it has absorbed from the web of paper in " passing from the couch roller to the pressing rolls. By this " process, besides the loss of time occasioned in stopping the " machine, inequalities are very liable to be made on the " surface of the felt by reason of the unequal beating to

" which it is subjected, and thus the quality of the paper made " in the machine becomes deteriorated." The invention consists in cleansing the felt by the use of a mechanical beater formed of rounded bars of hard wood attached to the under face of a horizontal plate, which beats the felt as it travels over a fixed bed similarly provided with wooden bars projecting from its face. The plate is hung by links to a lever frame or pair of levers, which have their fulcrum in brackets pendant from the main framing. At the extremity of the lever frame are adjustable stops and below the stops a pair of tappet wheels which lift the lever frame as they rotate, and allow it to fall; the felt is guided by rollers under the table carrying the rounded bars, and a counterpart table is fixed at the other side of the felt; as, therefore, the lever frame is lifted and let fall, the felt is compressed between the fixed and moving surfaces. The felt is cleansed by a stream of water directed on to it at the time of the beating.

[Printed, 10*d*. Drawings.]

A.D. 1859, July 4.—No. 1587.

HOLLINGWORTH, James.—" Improvements in machinery " or apparatus for the manufacture of paper."

The invention relates to the arrangement of that portion of paper making machinery technically known as the "deckle," which prevents the stream of pulp from flowing away laterally as it is carried over the endless web of wire cloth, and thus regulates the width of the continuous length of paper. The object of the invention is to so arrange the deckle bars that they may be readily moved simultaneously to or from each other, so that the width of the roll of paper may be varied with facility and without stopping the paper making machine.

The parallel longitudinal bars of the improved expanding and contracting deckle are connected to each other by two or more transverse rods or horizontal shafts, the bearings of which are bolted to the side standards of the machine; the extremities of these rods have long right and left handed screw threads cut on them. The ends of the transverse rods pass through nuts fitted in the deckle bars, which nuts have corresponding internal screws tapped therein. There are also jam nuts which traverse to and fro on the traverse rods, and serve to prevent any movement of the deckle bars arising from the continuous vibratory action of the wire and its connected mechanism. One extremity of each of the adjusting tranverse rods has fitted to it a worm wheel; each of these wheels is in gear with a worm keyed on a horizontal spindle arranged above the worm wheels and parallel to the side framing of the machine. The horizontal spindle is made in two parts, and is connected at the centre by a coupling with the view of allowing a slight lateral play to one of the transverse rods, so that the deckle bars may be opened out slightly wider at the outflowing end. The horizontal spindle is carried in bearings, which is bolted to the framing of the machine, and to one extremity of the spindle is fitted a hand wheel, by means of which it is actuated. The apron at the inflowing end of the deckle over which the stream of pulp flows is formed of a sheet of vulcanized india rubber, which extends across the machine and overlaps the wire cloths. The elastic nature of the material admits of the deckle bars being moved to and fro laterally, and at the same time preserves a uniform level surface. To alter the width of a web of paper, nothing more is necessary than to turn the hand wheel on the horizontal spindle; this puts the two transverse adjusting rods in motion, the screws of which working through the deckle causes the bars to approach or recede from each other according as it is desired to make a wider or narrower web of paper.

[Printed, 10*d*. Drawings.]

A.D. 1859, July 15.—No. 1673.

BROWN, FREDERICK.—(*Provisional protection only.*)—"The "preparation and manufacture of a new fibrous pulp for "making paper and for other purposes."

The invention consists in using for these purposes the leaves and fruit or any portion of the citris plant, or tree generally known as the citron, the orange, and the lemon tree, and the different varieties thereof. The leaves or fruit of the plant are steeped in boiling water for half an hour or thereabouts. The mass is then put into the engine in hot water and well washed; when it is sufficiently clear, lime water is introduced and washing proceeded with; when perfectly clean and about half broken up it is removed into the beating engine to bruise or beat it up into pulp in a weak solution of alkali in hot water.

It may then be bleached by chloride of lime or other bleaching material, and when of a proper colour is ready for use, either alone or mixed with other fibrous substances.

[Printed, 4*d*. No Drawings.]

A.D. 1859, July 20.—No. 1708.

ORIOLI, ZEPHIRIN GASPARD ALEXANDRE NATHAN PETRONE.—"New applications of hypochloride of alumina to bleaching "and dyeing, and to the disinfection and preservation of "organic matters."

The only part of this invention which has reference to this present series consists in the application of hypochloride of aluminum in the bleaching of (among other things) paper pulps. This new agent exists only in solution in water, and is obtained by the double decomposition of hypochlorite of lime and sulphate of alumina in equal quantities. By mixing solutions of these two salts a chemical action is produced forming instantaneously sulphate of lime. The inconvenience arising from the hydrochloric acid in ordinary bleaching is obviated by the use of hypochloride of aluminum as a decolouring salt, since it bleaches when losing its oxygen, and becomes changed into chloride of aluminum. A simple washing, occupying half an hour, is all that is necessary for eliminating the colouring matter, which is rendered soluble by the bleaching.

The chloride of aluminum formed in this operation being an antiseptic salt, a further advantage is obtained by the process of preserving the pulp from fermentation. The proportions of hypochloride of aluminum necessary for bleaching paper pulp and tissues or fabrics vary from three to five per cent.

[Printed, 4*d*. No Drawings.]

A.D. 1859, August 18.—No. 1898.

GRIMSHAW, WESTON, and MASON, SAMUEL, junior.—"Improvements in machinery and apparatus employed in washing, "bowking, bleaching, and preparing flax and other substances."

The first part of the invention is applicable to the rag engine, and consists in applying a steam and air-tight lid or cover to the cistern, by which means the rags or other materials can be washed and bowked under steam pressure, and afterwards *bleached* and reduced to pulp without being removed from the cistern. The second part of the invention consists in the application of two or more more triturating rolls to the same rag engine when it is made with a closed or air-tight lid or cover. According to this improvement, these rolls, when two are employed, are placed at each side of an oblong cistern, and both the rolls are driven by an oscillating steam engine connected to cranks fixed to the axles of the rolls, or by an ordinary steam engine with intermediate gearing. The third part of the invention consists in applying an eccentric roller, or a plate acted upon by an eccentric, or a wedge, under the triturating roll of the ordinary or of our improved rag engines, which eccentric roller or plate or wedge is furnished with teeth or blades; the cutting or tearing action of the triturating roll on the rags or other materials is varied as required by moving the eccentric roller, or the eccentric acting on the plates, or the wedge above referred to.

[Printed, 10*d.* Drawings.]

A.D. 1859, September 1.—No. 1997.

COLLYER, Robert Hanham. — (*Provisional protection only.*)—"Improvements in preparing materials for the manu-" facture of paper."

Preparatory to boiling in caustic alkali, the materials (previously boiled or soaked in water) are acted upon by rollers which triturate the material, crush excrescences, disintegrate siliceous cortex, &c., and bring the material to a fibrous state, open it out, or prepare it for the better permeation and action thereon of the alkali. The boiling in caustic alkali is conducted in a vessel fitted with perforated or sieve-like traps placed one above another, on which the materials are laid. Sometimes the alkali is drawn off and superheated steam allowed to act on the materials. To remove the alkali and other extraneous matters by washing, the trays, still charged with their contents, are attached to a lever to which a "jigging" or rocking motion is communicated.

[Printed, 4*d.* No Drawings.]

A.D. 1859, September 13.—No. 2089.

NEWTON, William Edward.—(*A communication from Edward L. Perkins.*)—"Improved apparatus for drying " paper and other fabrics."

To obviate the inconvenience arising from the use of a drying room, in which a moist state of the atmosphere rots the size, and of heated cylinders, where the effects of the steam generated operates injuriously on the size, the sized paper is by the present invention fed in vertically, and passed in a serpentine direction through the apparatus, during which it is exposed to a gentle vertical current of heated air, which is admitted through proper inlets at the bottom, and in passing up is warmed by a suitable heating apparatus, and, after circulating over the surface of the paper, escapes at the top, through outlets provided for the purpose. The heating apparatus is placed at the bottom of the drying chamber, and consists of coils of pipes, heated by steam or otherwise, apertures being made at the bottom of the drying chamber for the inlet of atmospheric air, which passes up between the coils, and thereby becomes heated. Above the heating apparatus, and communicating therewith, is a box or chamber fitted with a series of guiding rolls, between and over which the paper is fed, and made to travel up and down vertically through the chamber. The paper to be operated upon is wound upon the delivering roll, and is received, as fast as dried, upon a receiving roll at the opposite side of the drying chamber.

[Printed, 8*d*. Drawings.]

A.D. 1859, September 23.—No. 2159.

CASTELAIN, LÉON, and VASSEROT, CHARLES FRÉDERIC.—(*Provisional protection only.*)—"A novel application of "a plant to the manufacture of pulp for paper and mill-"board, and in the method of treating the same when so "applied."

"The invention consists, first, in the manufacture of pulp "from liquorice root; secondly, in the method of treating "the said liquorice root in such manufacture. For this pur-"pose I prefer to employ the residue of the liquorice root "after the liquorice juice has been extracted. This residue "is placed in cold water in a wooden vat having a double "bottom made of wire gauze. When it is well washed it is "passed between two cylinders so as to crush the plant; the "fibres are then boiled in soap water by means of steam for "*about six hours*, and washed again in cold water. After this "they are soaked in acidulated water for about half an hour; "they are washed again in cold water and placed in a mill so "as to reduce them into a pulp which is bleached by the "ordinary process. The manufacture of brown paper is conducted in the same manner with the exception of the "bleaching process."

[Printed, 4*d*. No Drawings.]

A.D. 1859, October 10.—No. 2302.

DAVIES, George.—(*A communication from Messrs. Jules Lagosse and Sons, and Frederic Quentin.*) — "Improve-"ments in the manufacture of paper, pasteboard, and card-"board."

This invention relates to means for avoiding in paper, made in continuous lengths, the tendency to adhere to the pressing roller, and to revolve with it, and thus become crumpled, torn, and losing smoothness, colour, &c., and consists, first, in furnishing the pressing roller, not only with a doctor intended to maintain the surface thereof free from plush, dust or dirt of any kind, but also with a counter-doctor, resting on the upper surface of the roller, facing the reel in an oblique direction to the former, so as to form a space which can be closed by a cover, and of which the surface of the roller forms a sort of moving bottom; and, secondly, in placing in this space one of the herein-after mentioned substances either in the state of pulp, juice, or liquor, which will escape continually in a very small quantity between the doctor and the roller, and will have the effect of maintaining the surface of the latter in a permanent state of non-adherence as regards the paper, which will then follow its own route on leaving the pressing roller.

The substances alluded to are principally the following:— Tubers, such as the potato; roots, such as the beet or mangold; bulbs, such as the onion; fruits, such as the melon and pumpkin; fleshy or farinaceous seeds and fruits, farina, or flour in general, such as that from cereals, fleshy leaves, and stems of plants and vegetables, bran, tea, barm, or yeast, non-resinous gums, certain acids, fresh milk. the sap of vegetables, leard bacon, saliva, urine, and other articles both animal and vegetable possessing similar properties.

[Printed, 4*d*. No Drawings.]

A.D. 1859, October 22.—No. 2414.

JONES, Peter.—"Improvements in machinery or apparatus "for suspending, carrying, and laying down paper, woven "fabrics, paper hangings, and all kinds of flexible materials "during and after the process of drying, and also for giving "a continuous positive motion to the suspending rods or "spindles."

"Instead or carrying the suspending rods upon ropes or "stamps which yield and become unequal in their action, I "cause the said rods to be placed upon a pair of endless "chains worked by chain wheels, which chains take up the "rods one after the other, and deliver them upon another pair "of traversing bars, alternately moving to and fro, so as to "advance a rod at each alternate movement, there being "other bars for the rods to rest upon during any required "interval. Or, instead of the chains and traversing bars, I "employ a pair of screws of the required length, and turn "them by gearing from any of the removing shafts of the "machine, the suspending rods being placed in the threads "of the screws and carried forward at any required speed, "the said rods being lifted by quadrant levers or internal "toothed wheels having external projections. After the "material has been suspended and dried, the suspending "rods, one after the other, are carried forward to another pair "of endless chains, which travel at a quicker speed, so as to "open the fold of the material, after which it is caused to "pass over one or more cylinders or rollers, whence it is "plaited down upon the carriage. In order to return the "suspending rods to the taking-up chains, I cause each rod "to be deposited upon a pair of endless chains or straps, work-"ing either vertically or inclined, the said chains or straps "having snugs or projections so as to carry forward the rods "and deposit them upon a pair of horizontal endless chains "or traversing bars, which carry the rods to a receiving box "at the front of the machine, from whence they are lifted "by another vertical or inclined pair of chains, to the feeding "or supply box, or for laying them one by one on the endless "taking-up chains. The aforesaid arrangements of endless "chains and traversing bars or screws give a positive motion "to the suspending rods or spindles and to the material they "support."

[Printed, 10d. Drawings.]

A.D. 1859, November 17.—No. 2604.

DRIEU, JEROME ANDRÈ, and LEGEAY, AUGUSTE.—"A "tissue, being a substitute for leather, millboard, and papier "mâchè."

The invention relates to the manufacture of a thick tissue of any material capable of being woven, such as cotton, flax, wool, silk, or any other fibrous material, either singly or mixed, and consists in using more than one warp, the one loose, the other as lacing or stitching, besides the one weaving in the ordinary way; the two faces (under and over) of the said tissue, forming altogether a single and solid cloth, as thick as required, in proportion to the weft used. After it is woven and out of the loom the cloth is dipped in a hot solution, of which "joiners' glue," soap, and alum form the basis, when half dry it is placed in a hot-press, and there left to dry. The cloth is afterwards passed between two cylinders, and is then as firm, as thick, and as strong as leather, and may be used as a substitute for leather, millboard, and papier mâché.

[Printed, 6*d*. Drawing.]

A.D. 1859, November 17.—No. 2609.

JULLION, JOHN LOUIS, and PIRIE, GORDON.—"An im-"provement in the manufacture of paper."

The invention consists in economizing the cost of making paper by adding to the pulp or body of the paper during the process of manufacture gelatine obtained from bones, as a substitute for the ordinary sizing agents. This gelatine is obtained by separating the constituent parts of bones or osseous matter by the action of suitable solvents, as described in the Specifications of Jullion and Pirie's prior Patents, Nos. 599 and 2042, A.D. 1859. This gelatine is added or mixed, alone or with other matters, to the pulp in the engine, or to either or both of the superficial surfaces of the web or fabric of the paper.

[Printed, 4*d*. No Drawings.]

A.D. 1859, November 23.—No. 2653.

BAGSTER, BENJAMIN.—"Improvements in means or appa-"ratus for giving surface finish to paper, which improvements

" are applicable to copper-plate and other printing, as also to
" embossing."

The improvements relate to forming the pressing surfaces of cylinders or segments of cylinders to which alternating motion is given, and adapted so as to admit of the paper operated upon being singly or otherwise placed between two connected polished surfaces for surface finish, another or others being introduced in succession as one is withdrawn. It is preferred to operate upon single sheets of paper, thereby admitting of higher speed being employed. For embossing, the plates or surfaces employed, or one of them, has on it the figures or configurations desired to be imparted. The lower plate serves as a bed plate, or a separate plate may be employed for that purpose. Motion is given to the segments from a rotary action, operated by steam or otherwise, and the two segments or segmental surfaces are so operated, that whatever motion is imparted to the one is also given to the other. When hot pressing is required, the polished surfaces are heated by steam or by enclosed jets of gas placed under the bed.

The improvements also relate to the application of such segmental surfaces with alternating motion to printing and other processes, facility being given by its double action, so that both ends of the machine or press can be employed at the same time.

[Printed, 10*d*. Drawings.]

A.D. 1859, November 24.—No. 2664.

LOSH, William Septimus.— "Improvements in the manu-
" facture of paper, and in the preparation of a substance to be
" employed therein."

The invention consists in the employment of a substance which sizes the paper, adds to its density, and at the same time renders the pulp less liable to adhere to the wires of the paper machine and to the rolls than when the ordinary methods of manufacture are followed. The substance is prepared by mixing carbonate of lime, or carbonate of barytes, or sulphate of lime, or sulphate of barytes, or carbonate of magnesia, or other like earthy substances in a finely divided state with resin prepared in the manner described in No. 2527, A.D. 1856, and while the resin is still mixed with water in a bleached state. Or instead of mixing such earthy substances with resin, prepared as last-mentioned, they are mixed with resin, treated in the manner described in No. 555 A.D. 1854. The earthy substances are mixed with the resin prepared according to either of the Specifications herein-before mentioned, in the proportion of four parts of the earthy substances to on of the resin. After well mixing, the resulting substance, termed by the inventor "improved patent size," is washed and ready for use. It may be added in almost any proportion to the pulp for the manufacture of paper.

[Printed, 4*d*. No Drawings.]

A.D. 1859, November 28.—No. 2688.

HODGE, PAUL RAPSEY.—"The treatment and use of a new " material in making of paper or other compounds of vegetable " pulp."

The invention consists in using spent brewers' hops in the manufacture of paper, papier mâché, patent fibrous wood, millboards, or any compound made of vegetable pulp, and also in the manner of treating and preparing the spent hop. 1. The spent hops are first digested at a heat(under pressure with steam) of from 220° to 250° Ft., and then pressing the feculent or mucilaginous matter from them. They are then steeped in cold water for a short time, and if for common paper, are immediately put into the pulping engine and cut up into pulp in the ordinary way. If for superior paper, they are steeped in a solution of bleaching liquor, or a solution of hydrochloric acid and water, or any of the solvents for gallic or tannic acids, both of which are present at all times in spent hops.

[Printed, 4*d*. No Drawings.]

A.D. 1859, December 13.—No. 2826.

REDWOOD, THEOPHILUS.—(*Provisional protection only.*)— " Improvements in the manufacture of paper and of substances " used in paper-making and for other purposes."

The invention consists, first, in the use of sulphite of barytes, either alone or previously mixed with starch or starch and vegetable fibre, which is added to the paper pulp for the purpose of correcting or preventing the injurious effects of chlorine compounds in the pulp, and in other ways improving the *quality of the paper*; and, secondly, in the use of sulphite of barytes mixed with animal, vegetable, or mineral size for sizing paper.

The improvements in the manufacture of substances used in paper making, and which substances are also applicable for other purposes, relate to the production of animal and vegetable size, and consist, in the first instance, in the use of bicarbonate of lime, for the purpose of neutralizing the lime contained in the pieces of animal skin commonly called glue pieces in the undried state, from which animal size is made, and which size may be afterwards made into the substance called gelatine ; and, in the second, in the use of starch which has been treated with chloride of lime and mixed with sulphite of barytes, for making a size suitable for sizing paper and for other purposes.

[Printed, 6*d*. No Drawings.]

A.D. 1859, December 16.—No. 2862.

HOLDEN, Edward Pilkington.—"Improvements in machinery for opening, carding, and cleaning cotton and other " fibrous materials when in a manufactured or partially manufactured state."

The invention consists in causing the cotton, &c., of which the waste is to be made to pass through a machine similar to a carding engine, but with drums and rollers covered with very strong card fillet or with spikes or teeth; the cotton or other fibrous materials, which usually consists of the ends of cops, or of pieces of fabric, or of shoddy, or of a mixture thereof, is fed into the machine, and after being opened, carded, and cleaned by the working rollers, "is " delivered by a doffer, as in other carding engines, thereby " effecting a considerable saving in the manufacture of waste, " or in opening, carding, and cleaning cotton and other fibrous " materials for paper makers or other purposes."

[Printed, 6*d*. Drawings.]

A.D. 1859, December 28.—No. 2927.

PENNEY, Henry.—(*Provisional protection only.*)—"Improvements in the treatment of vegetable fibres for the " manufacture of paper."

"I take a quantity of cocoa-nut fibre, tan, twitch grass, and " other such like vegetable fibrous substances, and pass them " either together or separately through a tearing or separating " machine, commonly known as a 'devil,' after which I well " boil them. They are then placed in a suitable vessel with " a quantity of concentrated solution of chloride of lime, and " exposed for several hours to the action of the atmosphere, " when, being well stirred, they are reduced to the desired " pulp ready for being converted into paper by the ordinary " means."

[Printed, 4*d*. No Drawings.]

1860.

A.D. 1860, January 9.—No. 56.

HILLEL, JULES FERDINAND.—"An improved machine for " squatting, separating, and tearing rushes and all other " textile fibrous plants."

The rushes are placed lengthwise on an endless cloth passing over two rollers, and are thus drawn under a third cylinder, which presses them by means of levers and counterweights, so as to render the layer of rushes solid and regular in thickness. They then pass under a series of circular grooved cylinders, composed of one large and five small cylinders, borne by plates. The space or distance is limited by two tie pieces, so as to form a moveable frame. This frame of small cylinders is pressed on the large one by four levers furnished with counterweights. The tie pieces are borne on these levers by slide pieces, having at the head a groove forming bearings to each tie piece. The axis of the large cylinder, together with the two tie pieces of the frame of the small cylinders, are attached to a balance beam placed outside the cage or framework jointed on a fixed point, and receiving its movement from the eccentric part of the driving shaft. The balance beam, by the rotation of the shafts, communicates a backward and forward inverse motion between the large cylinder and the frame of the small cylinders. The rushes during their passage between these cylinders are separated and slit up by the circular grooves, and the filaments are well separated by the movement of the cylinders produced by the balance beam. The matters then pass between two or more cylinders grooved lengthwise, on passing out of which they are caught by a devil turning with great rapidity, having spikes over its circumference, which tears and reduces the filaments till they form a sort of tow, which when bleached and well cleansed is used for the manufacture of paper.

[Printed, 10*d*. Drawings.]

A.D. 1860, January 17.—No. 118.

BROOMAN, Richard Archibald.—(*A communication from Benjamin Paraf Javal.*) — "Improvements in extracting " substances from cereal grains and some of their products, " and the application of the substances extracted."

The invention consists in dissolving the gluten only by the employment of weak agents which do not require concentration. The skin of the wheat is easily separated from the other parts by filtration, sifting, or otherwise. On being left to settle, the starch, with a part of the vegetable fibrin, becomes deposited, when by drawing off the supernatant liquor, the gluten is obtained in solution with the vegetable fibrin floating in it. If the liquid be allowed to remain for some time at rest, the whole of the fibrin will become deposited. The separation may be effected more quickly by the employment of a centrifugal filtering machine.

The precipitation of the gluten is also effected by the neutralization of the solution, if it is alkaline or neutral; by the addition of certain acids, even if the liquor is acid; by the addition of a number of salts, alkaline, neutral, or acid, or by the introduction of substances capable of forming insoluble combinations with gluten.

Gluten thus made is employed for fixing colours on fabrics, paper, textile fabrics, &c., and for giving a finish to and for preparing threads, tissues, leather, paper, &c.

[Printed, 4*d*. No Drawings.]

A.D. 1860, January 21.—No. 162.

McDOUGALL, Alexander. — "Improvements in the pre- " paration of materials used for sizing, dressing, or finishing

" yarns or threads and woven fabrics, applicable also to sizing " paper."

The invention consists in mixing steatite, soapstone, meerschaum, or an analogous compound of silica and magnesia (such as talc) in a finely divided state, with the materials commonly used for sizing, dressing, or finishing yarns or threads and woven fabrics, and for sizing paper. Flour size, for example, is made by taking one part by weight of the steatite or other such substance, reduced to a fine powder, and agitating it thoroughly with two parts by weight of caustic alkali at the strength of twenty degrees (using soda by preference), and then adding one part by weight of flour.

[Printed, 4*d*. No Drawings.]

A.D. 1860, January 25.—No. 189.

DONKIN, THOMAS.—"An improvement in paper-making " machines."

The invention refers to that part of the paper making machinery known as the pulp knotter or strainer, and consists in making the plates thereof in which are the slits or apertures through which the pulp passes, in a corrugated form, whereby, among other advantages, cheapness, lightness, and strength are secured. The knots or impurities fall into the bottom of the grooves between the ridges, whence they are readily collected and removed.

[Printed, 10*d*. Drawings.]

A.D. 1860, January 26.—No. 197.

BRINDLEY, WILLIAM. — (*Provisional protection only.*) — " Improvements in the manufacture of paper-board known by " paper-makers as 'middles,' extensively used in the manu- " facture of boxes."

The invention consists in manufacturing paper-board in the following manner :—Paper-board or "middles," as commonly prepared for making boxes and other articles, is first passed between pressure or other rollers, so as to calender the paper-board, and next subjected to a waterproofing and drying process described in the Specification of William Brindley's Patent No. 12,494, A.D. 1849. The paper board, when perfectly dry, is again subjected to the calendering operation and the material is then ready for use.

[*Printed, 4d. No Drawings.*]

A.D. 1860, February 2.—No. 266.

MENNONS, Marc Antoine François.—(*A communication from Adolphe Boyé.*) — "Improved machinery for strip-"ping and extracting the filaments of textile plants and "applicable to the treatment of fibro-ligneous matters in "general."

The invention consists in an improved mechanical combination for the direct stripping and extraction of the fibrous constituents or filaments of textile plants, which combination may, by slight modifications, be applied to the treatment (crushing, trituration, &c., &c.,) of fibro-ligneous matters in general. The leading features of the apparatus used for this purpose consist of an arrangement of bars which form endless tables, the corrugations or flutings of which are flanked by elevated ridges or ribs, and thus protected during the working of the apparatus. When employed in the preparation of vegetable matters used in the manufacture of paper pulps and analogous products, the corrugated surfaces of the endless tables are brought as close as possible together, so as to increase the triturating action and add to the fineness of the division of the fibres.

[Printed, 10*d*. Drawings.]

A.D. 1860, February 2.—No. 274.

ROUTLEDGE, Thomas.—"Improvements in the manufac-"ture of paper."

The invention refers to No. 1816, A.D. 1856, and consists in the preparation of half-stuff (paper pulp) and paper from esparto or Spanish grass, comprising the plants spartum ligeum, stipa tenecissima, dis, or alpha (commercially so denominated), by an improved and economical process of manufacture, the same being applicable to straw and other raw fibrous substances.

"It having been found that the lime in the ley prepared by "that invention sets or coagulates the silicious, albuminous, "glutinous, and gummo-resinous compounds or matters, and "fixes or dyes the colouring matters combined with all raw "fibres, rendering a more elaborate and costly system of "bleaching necessary; but the white so produced is not "*bright or permanent*, this invention proposes the employ-

" ment of a ley in which the lime is not, as it were, so " prominent."

The esparto, after being roughly sorted, is packed in a boiler ("the ordinary Lancashire bowking or vomiting kier"), a ley is then run in, composed of from 10 to 11 per cent. of carbonate of soda, and from 60 to 70 per cent. of the caustic or quicklime, that would be necessary to render that quantity of soda caustic. The soda salt is dissolved in water not less than ten times its weight, and the proportion of lime above-mentioned added, and when the solution is clear run over the fibre in the kier. The kier is kept for three or four hours on the "spring of the boil." The spent liquor is run off, and the kier filled up with water. The fibre is then taken to the ordinary rag-breaking engine and converted into half-stuff, the washing being conducted at the same time, as practised with the ordinary rag material; when the water runs off clear, the half stuff is let down into a vat with a false bottom and drained ready for the bleaching process.

Alternative processes are described.

The process of bleaching is that ordinarily employed for other paper material, either by gas or immersion in a solution of chloride of lime, either in steeps or the rag engine or poacher. The bleaching agency requires, however, to be more energetic than that employed for ordinary rag material. The bleaching process may be omitted, and the half-stuff converted into a strong, firm, tough, and smooth paper, or it may be semi-bleached, and in either stage, if desired, mixed with the ordinary rag material, with which it blends perfectly.

[Printed, 4*d*. No Drawings.]

A.D. 1860, February 7.—No, 323.

JENNINGS, HENRY CONSTANTINE.—"Improvements in the " manufacture of pulp."

The invention consists in converting spent tanners' bark, particularly that kind called twig bark, liquorice root, horse radish (genus cochlearia), chicory root, and ligneous substances of various kinds, by subjecting them to the pressure of iron cylinders, so as to divide the larger portions into thin discs or pieces; these are subjected to the action of a saturated solution of lime water, the whole mass to be raised to a temperature of *about 280° Fahrenheit* by producing within the vessel a tension of from 45 to 60 lbs. pressure upon the inch. To this solution is added about 10 per cent. of soda ashes, or about 15 per cent. of the common carbonated soda crystals of commerce, when the temperature is again raised to the above-mentioned degree. After about one hour this solution is drawn off and the mass immersed in a solution of sulphuric, sulphurous, or hydrochloric acids, to disengage the carbonic acid and neutralize the alkali. After these processes, which in some cases have to be repeated several times, the organic matter is bleached by the action of chlorine, chloride of lime, or other bleaching material, and the organic matter reduced to pulp by the common pulping machine.

[Printed, *4d.* No Drawings.]

A.D. 1860, February 8.—No. 341.

DURAND, JULES EMILE.—"The manufacture of poppy "paper."

The invention consists in manufacturing paper from the dried stalks of any of the varieties of the field poppy after the seeds have been separated therefrom. The dried stalks are first placed between rollers in order to partially crush them and effect a division of their fibres. They are then chopped and submitted to the action of steam in a closed vessel, in order to swell out the cellular portions and dissolve such extractive and soluble matter as the plant may contain, they are thus rendered more open to the cleansing or detergent action of a caustic bath prepared in the proportion of about 20 per cent. of lime of the entire weight of the dried fibrous substance. The stalks are left about ten hours in the solution at a temperature of from 239° to 248° Fahrenheit, the mass being kept in constant agitation; the cellular portions are by these means sufficiently opened out and partially freed from extraneous substances, and may be cleansed by repeated washings in water to prepare them for undergoing in the vats the pulping, purifying, and bleaching operations, which may be effected by the means commonly employed in the manufacture of paper.

[Printed, *4d.* No Drawings.]

A.D. 1860, February 29.—No. 564.

COLLYER, ROBERT HANHAM.—"Improvements in the manu-"*facture of* pulp and in preparing materials for the purpose,

" and in apparatuses employed therein, part of the invention " being also applicable to preparing materials for fibrous and " textile manufacturing purposes."

The invention, which is an improvement on No. 550, A.D.1859, consists—1. In taking the straw, flax, waste, bamboo, cane, hemp, or other material in the natural dry state, and submitting it to the triturating action of "disintegrating" rollers running at different speeds, or of rollers of different diameters running at the same speed. The substance is thus prepared for the alkaline treatment, for which purpose the material is placed in layers, that is to say, laid upon trays, shelves, or diaphragms in the boiler, into which alkaline solution is to be introduced, and after treatment therewith it is washed by imparting to it a jigging or oscillating movement in the water or wash liquor, and is then ready (after bleaching it when required, or without bleaching it,) to be converted into pulp for the manufacture of paper, pasteboard, papier mâché, or other like purposes.

2. The invention also relates to an improved mode of, and apparatus for, boiling or treating the invention by the alkaline solution. This method and apparatus are also applicable to the preparing of materials for fibrous or textile manufacturing purposes. A covered boiler or vessel, in combination with one or more pumps, is so placed, and has inlet and outlet pipes so arranged as to take up the alkaline solution from a reservoir, chamber, or space, preferably at the bottom of the boiler, pump it up, and convey it to the material which is placed in the boiler in layers, that is to say on trays, shelves, or diaphragms, the solution being forced into the boiler and discharged in a shower or showers upon and between the layers of material through perforated coils or otherwise. Superheated steam is caused to act on the material while being saturated by the alkaline shower, this steam being admitted into the boiler so as not to pass into or come in contact with the solution while in the reservoir or space from which it is pumped up.

3. The invention consists in substituting for "the toothed " or ribbed roller and bed plate, composing the beating " engines hitherto employed," a machine consisting of a pair of rollers with smooth surfaces, the under roller being of much smaller diameter than the upper, which rollers are so geared

or contrived as to produce a triturating action. The feed of material to the machine is accelerated by the addition of a paddle-wheel, or wheel with guide plates or blades on its periphery.

[Printed, 10*d*. Drawings.]

A.D. 1860, March 20.—No. 724.

GARDNER, Edward.—"Improvements in apparatus for the " manufacture of paper."

The invention relates to the "making cylinder" in a paper-making machine, and consists, according to one modification to be used in the production of laid paper, in grooving or channeling the surface of the cylinder, such grooves or channels communicating with the interior of the cylinder by suitable passages or openings. Transverse ribs or grooves at right angles to the grooving or channeling of the cylinder are also provided at suitable intervals. Any suitable design or trade mark may be made on the surface of the cylinder during the cutting process. Inside this cylinder is fitted a vacuum box, connected by a pipe with any convenient exhausting apparatus. According to another modification, to be used in the production of wove paper, it is proposed to apply a wire gauze covering to the surface of the cylinder, such surface being composed of a number of grooved strips of metal placed side by side, with slits or apertures at convenient distances for establishing a communication with the vacuum box inside the cylinder. These grooved strips of metal serve as a foundation or support for the wire-cloth, and the use of the backing wire is thereby dispensed with.

[Printed, 6*d*. Drawings.]

A.D. 1860, March 23.—No. 749.

VIGURS, Henry. — "Improvements in the treatment of " paper or cardboard, such paper or cardboard being used " for cards, wrappers, or boxes for exhibiting or holding small " articles usually sold on cards or in boxes, as also in the " form of such boxes and wrappers, and the manner of attach- " ing specimens of contents thereto."

The invention consists in forming the paper for these purposes in such a way that strong fibrous threads or bands may be laid and stretched in certain places of its composition, such threads or bands imparting to the paper or cardboard general additional strength in the direction in which they are laid. The top or other suitable part of the box or wrapper is cut, moreover, so that such threads, with a portion of the paper with which they may be embedded, shall clip the article or articles so exhibited, and, from the great additional strength imparted, admit of such articles being handled, removed, or applied without injuring or tearing the apparently fragile loop that confines it. When using the ordinary paper of which such cards, boxes, and wrappers are or may be composed, clips of thin sheet metal, &c. are applied, if of metal the ends may be formed so as to puncture the part of the box where they are intended to be placed, and the part passing through to be closed or bent down on the inside or to have indented shanks formed on it, which shanks pass through corresponding holes to be closed or rivetted for securing the clip, and which clip, being made of hard metal, will afford [sufficient elasticity to yield and spring back, so as to allow the article confined (by it) to be readily removed or applied.

[Printed, 1*s*. Drawings.]

A.D. 1860, March 26.—No. 775.

MARTIN, Charles, and PIDDING, William.—(*Provisional protection only.*) — "Improvements in the manufacture of " paper, applicable also to the manufacture of " "various " articles of utility; vehicles, houses, sailing and steam vessels " and boats; in the mixture of liquids, fibrous and other " substances, or materials for such purposes, and in the " machinery connected therewith."

The invention consists of a novel method of making paper by passing the pulp or material when prepared in the usual way or otherwise on to a hollow air-tight cylinder. Connected to its centre, by means of a hollow shaft or spindle, is a vessel or vacuum chamber, the vacuum in which is maintained by an air-pump operating upon it; the outer circumference of the air-tight cylinder is made of finely perforated metal or wire gauze covered with flannel or other suitable material, on to which, as it revolves, the pulp or other material used is *allowed to flow,* and the liquid is abstracted by the vacuum

before named, leaving the pulp or material in a proper state to be conveyed on to drying cylinders; "also the paper or
" material so made or otherwise cut into strips or by the
" cylinder having divisions, or by a cylinder of suitable width
" and form, and either in connection with such cylinder or
" subsequently, the spindle and fly as used in the manufac-
" ture of cotton to convert such into string by giving to it the
" necessary throw or twist, and to size such paper or material,
" or to combine with it caoutchouc in liquid state while in
" the vessel or during its manufacture, and in the manufacture
" of paper bags, envelopes, or similar articles, by making a
" mould of suitable form of perforated metal or wire gauze,
" prepared as before described, and connected with the
" vacuum chamber, which mould or form being placed in the
" pulp or material and allowing the exhaust apparatus to
" operate, will at once make the article desired, hats, bonnets,
" caps, and other articles in like manner."

[Printed, *4d.* No Drawings.]

A.D. 1860, March 26.—No. 781.

NISSEN, HENRY NICHOLAS.—(*Provisional protection only.*)—
" Improvements in the preparation of paper in order to pre-
" vent the extraction or alteration of writings thereon without
" detection."

The invention consists in "preparing paper, during or after
" its manufacture, with a solution of iodine, iodide of potas-
" sium, and liquor potassæ. I either use paper so prepared
" for writing on directly, or with the previous addition of a
" pattern, figure, or device impressed thereon from any print-
" ing surface in an ink or material composed of or prepared
" with prussiate of potash or any other mineral or vegetable
" colouring matter, subject to discolouration on the applica-
" tion of any of the usual agents employed for the removal of
" writing ink."

[Printed, *4d.* No Drawings.]

A.D. 1860, March 27.—No. 792.

CLARKE, HENRY MARTYN.—(*A communication from Thomas Eustice, and Joseph Jordan, junior.*)—"A new and useful
" or improved machine for the making and sizing of pulp
" *used in the* manufacture of paper."

The invention consists in an improved pulp making and sizing engine. This is constructed not only of a single conical grinder and outer grinding shell or case thereto, but with pipes for the introduction of the rags and size, the eduction of both being arranged with reference to the axis and ends of the grinder, so as to enable the grinder to act in reducing the rags to pulp and in mixing the sizing therewith. The reduction of the rags first takes place near the smaller end of the rotary grinder, the ground rags being finally discharged under the grinder and near to its larger end, the construction and arrangement of the grinder being such as to enable gravitation to operate in effecting the passage of the pulp from the induction pipe at one end of the case to the eduction pipe at the opposite end thereof.

[Printed, 6*d*. Drawings.]

A.D. 1860, March 28.—No. 804.

COLLYER, ROBERT HANHAM.—"Improvements in manu-
"facturing pulp for paper, paper mâché, and other similar
"uses, and in apparatus employed therein, part of the inven-
"tion being also applicable to other operations, in which
"materials have to be subjected to the action of liquids, steam,
"and other fluids."

The invention relates, first, to the treatment of materials for the above manufacture, and to certain improved means of carrying into effect a former invention, No. 564, A.D. 1860. In the apparatus which is here employed for performing that invention, and which may also be applied when other fluids are used instead of alkaline solution and superheated steam, a shaft is fitted vertically or nearly so through the centre of the "receiver" in which the materials are placed, and in which they are subjected to the alkaline solution and steam. This shaft passes down through the trays, shelves, or boxes supplied with the layers of material to be acted upon and placed in the receiver, and is furnished with agitators, rakes, brushes, &c., mounted sufficiently loose to yield and not press too forcibly on the materials under treatment, which are by means of these agitators moved about and thoroughly exposed to the action of the liquid steam or fluids used. The trays may be constructed with slides of wirework or reticulated or perforated material, and with a solid bottom, with which may be combined a false or second bottom of wire work, or reticulated or perforated substance, a perforated coil being placed within each tray, between the two bottoms thereof. After the alkaline liquid has been drawn off, as stated in No. 564, A.D. 1860, washing liquor may be supplied to the receiver, and distributed over and among the materials, and so wash them without having to remove them from the receiver for the purpose. The materials may then be bleached also without removing them from the receiver, by introducing the bleaching liquor into such receiver.

[Printed, 8*d*. Drawings.]

A.D. 1860, April 5.—No. 873.

DUSATOY, Charles. — (*Provisional protection only.*) — "Improvements in apparatus used in the manufacture of "paper."

"In place of the 'hog' or other stirring apparatus hereto- "fore employed in order to keep up a uniform circulation of "the pulp in the vat, and to keep it in an equally intermixed "state, a horizontal plate or instrument, by preference some- "what hollow on its upper side, is used, and it is caused "continually to rise and fall a short distance slowly, parallel "to and near the bottom of the vat or vessel containing the "pulp ; but the plate or instrument may be made to rise and "fall at an inclination to the bottom. This rising and "falling of the plate or instrument may be accomplished in "any convenient manner, but it is preferred that the plate "or instrument should be fixed to the lower end of an arm or "bar, which at its upper end is cranked, so as to pass out of "the vat or vessel, and pass through two slides which are "guided between upright guides, such slides receiving an up- "and-down motion by means of two excentrics or otherwise ; "by these means the vat is independant of the mechanism, "there being no shaft or axis passing through the sides or "other part of the vat."

[Printed, 4*d*. No Drawings.]

A.D. 1860, April 11.—No. 910.

HILLEL, Jules Ferdinand.—"Improvements in the appa- "*ratus and in* the mode of treating Spanish grass and other

" fibrous materials to be used in the manufacture of paper " pulp."

The heel or knotty portion of the plant having been removed, the fibre is placed in an apparatus specially disposed so as to steep, boil, and steam it in succession. The fibres may then be separated by the process described in No. 56, A.D, 1860. The fibres are next treated with an alkaline solution until their gummy or resinous substances are dissolved, when they are washed, and are thus ready for bleaching by means of a solution of chloride of lime specially prepared. Mechanism is described by which the mass in the bleaching vat has imparted to it a vertical and horizontal motion. The pulp is dried by " passing currents of hot air through the mass from the surface " downwards, in contradistinction to the ordinary method of " passing it upwards."

[Printed, 4*d*. No Drawings.]

A.D. 1860, April 12.—No. 920.

PETRIE, John, junior.—(*Provisional protection only.*)— " Improvements in machinery or apparatus for washing rags " and other materials used in the manufacture of paper."

The invention consists in the employment of a revolving cylinder, between which and a concave surface the rags or other materials are caused to pass, together with a stream of water or other fluid. As the cylinder revolves the concave surface is caused to travel round its axis for a portion of a revolution to and fro, during which it is drawn towards the cylinder by cords or chains passing over pulleys and attached to weighted levers, or by other means which will allow of elasticity. The cylinder and the concave surface are made with corrugations or with other uneven surfaces.

[Printed, 4*d*. No Drawings.]

A.D. 1860, April 18.—No. 973.

DURHAM, George Wilson.—(*Provisional protection only.*) —" Improvements in machines for washing rags, pulp, and " other fibrous materials."

The invention consists in the introduction of a roller, having one or more brushes attached, into washing machines used for *washing rags, pulp,* or other fibrous materials in the manufacture of paper, "which roller I dispose immediately above the "perforated bottom of those machines, and communicate "motion thereto by a suitable spindle. This application of "a brush-roller facilitates and improves the operation, and "whereby the pulp can be washed sufficiently clean and pure "for bleaching and making into writing and printing papers."

[Printed, 4*d*. No Drawings.]

A.D. 1860, April 23.—No. 1010.

PHILIPPE, Jules Alphonse.—"A new process and apparatus for bleaching fabrics and substances that can be "bleached, such as thread, textile plants, and paper pulp."

The invention purports to reduce the whole process of bleaching (which now requires a week or more) to five operations, occupying about twenty-four hours. First, the fabric or material is caused to be alternately permeated by a hot bath of seeds and dry steam. The seeds to be used are composed about as follows:—1,000 parts weight of water, 5 parts green or liquid soap, 25 parts lime water, and from 5 to 10 parts subcarbonate of soda. The next operation consists in washing the fabric or other substance in pure water, and then immersing it in a bath of water acidulated with chlorhydric acid. The third operation consists in washing and beating the fabric or other substance again in clear water, and then putting it into a bath of strongly diluted chloride of lime. In the fourth operation, the fabric or other substance is taken from the chloride bath, rinsed again, and passed through an acidulated solution like that described in reference to the second operation. The fifth operation consists in again rinsing the fabric or other substance, and then immersing it in a strong diluted bath of soap and bran water, which is heated by a steam jet.

The apparatus contrived for this movement of the fabric or other substance when subjected to the action of boiling seeds and dry steam, is composed of a cylindrical vessel made of wood or other suitable material through which pass central revolving shafts driven by means of pulleys or other mechanical arrangements. On this shaft, inside the said cylindrical vessel, are fixed two sets of arms radiating from two bosses that are set at a distance equal to the width of the fabric, &c., and the *said arms* carry hooks or equivalent implements on which the fabric, &c., is fastened from the centre to the periphery in spiral or other shaped suitable layers. The shaft is then set to revolve slowly, and steam being let in, and the lower portion of the cylindrical vessel being filled with the proper seeds, the alternate action herein-before referred to is effectually obtained.

[Printed, 10*d.* Drawings.]

A.D. 1860, April 25.—No. 1043.

HARTMANN, Jules Albert. — (*Provisional protection only.*)—"The extraction of a certain colouring matter from "rags and other waste vegetable textile fabrics containing the "same."

The object of this invention is to recover the colouring matter, alizarine ($C_{20}\,H_6\,O_6$), from cotton rags and other waste vegetable textile fabrics which have been dyed or printed with madder or other dyes, in which alizarine is the colouring base or principle. Cotton rags, prior to their being converted into pulp for paper, are treated with acids, salts, alkalis, and other chemical substances which, alone or combined with other agents, possess the property of separating the colouring agent, principle, or base. The rags, &c., are first treated with water slightly acidulated, say, with muriatic acid, in order to dissolve the metallic oxide mordants. Saline or alkaline solutions, such as a solution of alum, which dissolve and separate the colouring matter, are then used. The rags are removed or the solutions drawn off or run out from the vessel, and the colouring matter obtained by precipitation or evaporation.

[Printed, 4*d.* No Drawings.]

A.D. 1860, May 15.—No. 1194.

HOOPER, Bartlett. — (*Provisional protection only.*)—"Improvements in the manufacture of a paper suitable for "preventing forgery."

"I manufacture the paper in the ordinary way, but I first mix "with the pulp a portion of sesqui or peroxyde of iron, or of "the oxyde known as the black oxyde, but I do not confine "myself particularly to using these oxydes in their pure state, "as I may previously dissolve them in hydrochloric acid or "other acids before mixing them with the pulp; or I may

" impregnate the paper with the solution in its further process " of manufacture before sizing it, or I may impregnate any " paper after it is completely made and sized.

"The advantage of my buff coloured paper is, that common " writing ink, a soluble tanno-gallate of the protoxide of iron, " becomes, when used on this paper, converted by the presence " of the protoxyde of iron therein into an insoluble tanno-" gallate of the peroxyde of iron penetrating deeply into the " paper; thus, chemicals employed to remove the writing are " required to be so strong that the paper is so bleached or " otherwise stained that the attempt is plainly visible."

[Printed, 4*d*. No Drawings.]

A.D. 1860, May 15.—No. 1198.

DENIS, JULIEN.—" Improvements in the preparation of " vegetable matters as a pulp for the manufacture of paper."

1. A ton or a ton and a half of raw material is put into a tub, and, for every 1 cwt. of raw material, 11 lbs. of sub-carbonate of soda are dissolved in 11 gallons of hot water; when the dissolution is perfect 2¾ lbs. of liquid chlorine are thrown in. It is necessary that the lye should be five or six inches from the top of the materials, as the steam which condenses in the tub often produces too much water. 2. When the materials are well boiled, they are put into a reducing cylinder, which reduces them to fibre of two or three inches in length. 3. To neutralize the sulphate of iron, which, as well as sulphate of copper, is usually contained in textile plants, which render the bleaching difficult and costly, besides weakening the fibre.—The materials in the tub are thrown into a bath of muriatic acid and marine salt. After steeping for three hours in this bath the liquid is withdrawn and used again. After this the pulp should be washed in the tub with three waters; it is then taken out and put into suitable receptacles to drain, thence to undergo the next operation. To neutralize the sulphate of copper, a bath is made of sulphuric acid and marine salt, salts of nitre, or nitrate of soda, and the process is continued as above mentioned.

4. "I make a bath of liquid chlorine marking one degree of " the acidimeter Beaumé to well saturate two cwt. of material " which have been placed in the bath of acid amounting to " 154 or 176 *gallons*. I dissolve in it 5 lbs. of sub-carbonate

" of soda, or sulphuret of soda, nitrates, phosphates, azotates, " silicates, aluminas, carbonate of lime, or any chemical " products which are soluble and contain carbonic acid or " azote, and which have also some power of decolourization, " which I add to the chlorine to neutralize its acidity, for as " soon as the substances are dissolved the bath becomes of an " unctuous nature. I can heat this bath to a temperature of " 20 to 25 degrees centigrade, or even to 50 or 60 degrees, " without burning the materials, although it is well known by " all paper manufacturers that they could not hitherto heat " their chlorine even to 10 degrees without burning the " materials submitted to its action. When the bath is heated " to the above temperature I put into it the material, which I " leave for three or four hours, taking care to well stir it every " half hour. This operation ended, I reserve this bath for " after uses, as I will explain. I now wash the material in " the tub and take it out to drain. 5. I make a bath of " chlorine, marking two degrees of the acidimeter Beaumé, " and for this bath I prefer to any other the nitrate of soda, " and always in the proportion of 5 lbs. to every 154 to " 176 gallons. I heat this bath to 15 degrees centigrade, and " proceed as in the fourth operation by adding to it half the " amount of ingredients and chlorine employed to make the " former bath. 6thly, or last operation, I wash the pulp, and " if it is to be of a superior whiteness, I throw into the bath " 6½ or 8½ gallons of chlorine at two degrees, shutting off for " half an hour the influx and efflux of water; after this " I bathe it with a great quantity of water, and before taking " the pulp out I throw into it, dissolved in water, from 1½ oz. " to 2 oz. of proto-chloride of tin, to disinfect the pulp and " neutralize the acids, as well as to prevent the pulp or the " paper subsequently turning yellow. To keep and distribute " this pulp to the manufacturers it must be dried."

[Printed, 6*d*. Drawings.]

A.D. 1860, May 19.—No. 1228.

NISSEN, HILARY NICHOLAS.—"Improvements in the pre-" paration of paper in order to prevent the extraction or " alteration of writings thereon without detection."

The invention consists in treating paper with a preparation *of iron, together* with ammonia, prussiate of potash, and chlorine, either when in pulp or when in process of being sized. The paper is used for the ordinary purposes of writing on directly or with the previous addition of a pattern, figure, or device impressed thereon on one or both sides from any printing surface in a fugitive or other material. The invention may be used in combination with Dickinson's Patent for the introduction of thread in paper, or with Varnham's Patent for introducing a coloured pulp between two sheets of paper, or with impressions from plates engraved by the patented process of Messrs. Perkin and Bacon, known as the "white line " engraving."

[Printed, 4*d*. No Drawings.]

A.D. 1860, May 23.—No. 1277.

SUMMERSCALES, JOHN, and **SAGAR**, JUBAL. — (*Provisional protection only.*) — "Improvements in washing, " wringing, mangling, squeezing, and crushing machines."

The third part of this invention relates to a wringing and mangling machine in which one spiral spring only, which is direct in its action, keeps the rollers perfectly parallel when the regulator is used. This spring is combined with two levers, and dispenses with the two or four springs "respectively used hitherto," and also with the india-rubber buffer. To the levers are attached two regulating screws with lock nuts, one of the nuts being over the other under the top cross bar, "thus " dispensing with the levers, packings, and set screws hereto- " fore employed."

The fourth part, which relates to wringing and mangling machines, is also applicable to squeezing and crushing machines for paper, bones, or other substances where extraordinary pressure and weight are required. It consists in the addition to the last above-named arrangement of a system of levers and weights acting simultaneously and in combination therewith, and bearing upon the axes of the upper squeezing or crushing roller.

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 6.—No. 1387.

STEVENS, CHARLES. — (*A communication from Jean Pezieux, Balthazar Masson, and Antoine Meillard.*)—" A

" new material for packing and other purposes, together with " the apparatus used in the manufacture thereof."

The invention consists in making a strong material for packing and other similar purposes by coating canvas, cotton, or other tissue with the pulp used in the manufacture of paper. The canvas is rolled on a cylinder attached to an ordinary paper-making apparatus, and the pulp is made into paper on the tissue, which unrolls itself by degrees as the paper is formed, or the paper may be rolled in an endless band round two parallel rollers, below which is a third roller, round which a piece of canvas or tissue is wound. Below the latter a basin or receptacle filled with paste or glue is placed. On the upper part of the frame two pressing cylinders are arranged. Finally, a roller is arranged over all to wind up the cloth paper as it is finished.

The manner of working the machine is as follows:—The two ends of the pieces of paper are brought together by passing them between the two pressing cylinders; they are then raised as far as the upper wheel; the cloth is then unrolled and made to descend into the basin, where it passes under the rod fixed inside, and being impregnated with the paste, it again ascends and passes between the two pressing cylinders and the two pieces of paper, as above-mentioned, as far as the upper wheel, to which all three are attached by the ordinary method of a groove with rod. These preparations made, there only remains to put the upper wheel in motion by means of the handle, when the whole machine is set in movement. The two pieces of paper, as they unwind, become united to the cloth forming the cloth paper.

[Printed, 6*d*. Drawing.]

A.D. 1860, June 6.—No. 1388.

STEVENS, CHARLES.—(*A communication from Eugène Helenus.*)—"An improved mode of preparing various plants " to be used in the manufacture of paper."

The invention relates to the preparation of sparte, diss, alpha, alois, the dwarf palm, stypa tenacessima, and others of similar nature. All these plants possess, as the ruling principle, nearly the same elements, viz., a gummy resinous matter, gluten, and tannin in considerable quantities. The plants are treated with a solution at the highest degree of alkali, potash, or soda. The quantity of alkali to be employed, if anhydrous, to 100 parts of the plant varies from 10 to 25 parts. In treating the alpha plant, 20 parts of anhydrous soda to 100 parts of the plant may be successfully employed. By these means, after the bruising and washing of the prepared plant, a pulp very easy to bleach is obtained. The alkali does not affect the tenacity of the fibres, and the chlorides used in the bleaching being at a low degree, act but insensibly. The azote in the organic matter of the above plants disengages itself in great part under their influence in the form of gaseous ammonia.

[Printed, 10*d*. Drawings.]

A.D. 1860, June 12.—No. 1433.

REDWOOD, THEOPHILUS.—"Improvements in the manu-"facture of paper."

This invention consists in the use of sulphate and sulphite of barytes, mixed while in the recently precipitated and still moist state with rice or other small grained starch, which mixture is added to the paper pulp in the manufacture of paper, or to the size used for sizing paper, for the purpose of preventing the injurious effects of chlorine or chlorine compounds in the pulp, and generally improving the paper.

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 13.—No. 1448.

SPENCE, WILLIAM.—(*A communication from George E. Vanderburgh.*)—"Improvements in the mode of, and appa-"ratus for, reducing silicious substances to a fluid state."

By this invention a liquid silicate is produced which may be substituted for starch and size in the production of waterproof and fire-proof paper, cardboard, &c. A small per-centage of some alkaline base is incorporated with the siliceous substance to be operated upon, and in the subjection of such composition to the direct action of superheated steam whilst enclosed within a suitable vessel, also in the application of the fluid or liquid silicate thus produced to the various uses for which it is adapted.

The digesting portion of the apparatus must be so arranged that the *siliceous and* alkaline composition to be placed therein can be retained whilst in an undissolved state in the upper portion of the digesting chamber, or be continuously raised above the surface of the liquid in the lower portion of the same for the purpose of allowing of the admission of the superheated steam into the said chamber, so as to act directly upon the said composition. The superheated steam is admitted to the apparatus by a central pipe, and discharged therein through slotted pipes at the end of radial arms, so as to act directly on the composition as it is raised by revolving elevators. The digester has a double casing into which steam may be admitted, and is supplied with pipes for drawing off the water produced by condensation.

The siliceous substance usually employed is clean sand, and the alkaline substance commercial potash or soda; but in the place of sand siliceous stones may be employed after they have been reduced to the requisite degree of fineness by any of the well-known methods. The usual proportions of the siliceous and alkaline substances, which together form the composition referred to, are about 85 per cent. of the former to 15 per cent. of the latter.

[Printed, 8*d*. Drawing.]

A. D. 1860, June 14.—No. 1454.

HENRY, MICHAEL.—(*A communication from Louis Henry Obert, Jean Baptiste Vasseur, and Auguste Houbigant.*)— " Improvements in treating vegetable substances so as to " obtain paper pulp and other useful products therefrom."

The object of this invention is the treatment of vegetable substances so as to obtain paper pulp and other useful products, such as materials for textile and fibrous manufactures, alcohol, oils, fecula, and gums, acids, resins, colouring, saponaceous, and tanning matters. The invention is not confined to the conversion of any particular description of plant, but relates to a process applicable to plants generally, and consisting of a series of successive stages.

1. Process by which the vegetable substances are disintegrated, decolourized, and reduced to pulp, and the fibres or filaments, tanning, colouring, and other useful matters which they contain are extracted from them by the action *of steam on them* in a closed boiler, receiver, or vessel.

2. Distillation of plants and vegetable substances by means of steam in a closed vessel, in order to disintegrate and decolourize them and obtain paper pulp therefrom, heat being applied either directly by a generator or by steam admitted at several atmospheres in a jacket or double casing, or by a *bain marie*, the alcoholic and other products of distillation being received in vessels graduated and arranged to collect them according to the various degrees of purity. 3. Mode of subjecting the substances to steam or heat, termed the hot treatment, by means of steam under pressure in a closed vessel or boiler for the purpose of disentegrating and decolourizing them and converting them into paper pulp. 4. Employment of a combination of apparatus for peforming the disintegration, hot treatment, decolourization, and bleaching of the vegetable substances in order to operate thereon and convert them into pulp. 5. The mode described of preliminarily crushing the substances by means of an arrangement of rollers, one pair over another, in such manner that the substances may pass down and between them, together with a continuous stream of liquid, whereby they are caused to travel away more readily. 6. Employment in and for the steeping process of the baths or liquors used for the hot treatment in the closed boiler instead of alkaline salts. 7. Mode of extracting or obtaining from the plants and vegetable substances paper pulp, colouring materials, and other useful products, derivable from them by a series of consecutive stages constituting in combination one process.

[Printed, 1*s*. Drawings.]

A.D. 1860, July 6.—No. 1633.

LAMBERT, BENJAMIN.—"Improvements in treating printed " paper to remove the ink and to obtain pulp; and also in " treating printers' rags to remove the ink therefrom."

For these purposes the printed paper is first reduced into pulp, then boiled in a weak caustic alkaline ley for some time in a covered vessel, and then allowed to soak for several hours in the same ley without heat. The ley is then removed and a fresh one introduced into the vessel, and the pulp or broken up printed paper is boiled therein. If *there is much ink* present, and the colour bad, it is desirable after the second boiling to again allow the pulp or broken up paper to stand and soak for a time. The pulp or broken up printed paper is then well washed till the colour of the ink is removed, when the pulp will be suitable for being used in the manufacture of white paper. In treating copper plate printers' rags and other printer's rags impregnated with printers' ink, such rags are boiled for a time in a weak caustic alkaline ley. The ley is removed, and the rags are then again boiled, but in another weak alkaline ley. The rags are then to be washed till the ink has been completely removed, when the rags will be again suitable for use. The colouring matter of the ink, when sufficiently valuable, may be again obtained from the alkaline ley and wash waters by precipitation and evaporation.

[Printed, 4*d*. No Drawings.]

A.D. 1860, July 6.—No. 1635.

DE MAEGT, JOSEPH.—(*Provisional protection only.*)—"Improvements in the manufacture of paper."

The invention consists in manufacturing paper from the refuse of hops. The refuse is first treated with potash or soda in variable proportions, according to the degree of cleansing it may require; after which it is to be treated in the same manner as rags now are in making pulp. The required quantity of alum, China clay, size, and other substances used by paper makers, according to the description of paper required to be produced, is then added to the mass, and the pulp thus prepared may be made into paper in the ordinary way, suitable for printing on and a variety of other purposes.

[Printed, 4*d*. No Drawings.]

A.D. 1860, July 25.—No. 1796.

HÉDOU, EUGENE.—(*Provisional protection only.*)— "Improvements in the manufacture of 'tar paper,' which improvements may also be applied to several other uses."

"Hitherto tar paper has been made with old ropes and cloth containing tar after being suitably worked and reduced to a pulp."

This invention consists in employing pulp made of any suitable material, and afterwards treating the same with a peculiar tarry liquid or composition. The composition is made by boiling about three hours 11 gallons of tar with about the same quantity of vegetable glue as employed in the manufacture of paper. Into this mixture about 6½ gallons of boiling water are poured and well mixed and boiled for five minutes. In a vessel holding about 130 gallons of water are placed about 110 pounds of potato or other suitable flour, taking care to saturate it completely, which done, the tar dissolved with the vegetable glue is poured into the vessel with about 33 gallons of boiling water; the whole is well stirred till the tar becomes incorporated with the flour and forms a tarry composition, which may be used in the proportion of about 27 gallons per 220 pounds of paper pulp.

[Printed, 4*d*. No Drawings.]

A.D. 1860, July 26.—No. 1815.

BONELLI, GAETANO. — (*A communication from Jean Manzoni.*)—(*Provisional protection only.*)—"Improvements " in the manufacture of felted fabrics and paper."

The invention relates to the employment in such manufactures of certain vegetable substances not heretofore used for such purposes. The plants intended to be employed for the purposes of the present invention grow in bogs and marshy places, and are rushes or grasses known under the botanical name of scirpus and eriophorum. The different kinds of the latter *genus* furnish a cottony substance, and the head or seed pod of the principal stem of the former plant is composed of a number of fine fibres radiating from the central stem. These fibres are attached to the ends of the fine seeds, and when the solid head of the plant is broken up, so as to disentegrate the fibres, a fine cottony or flaxy fibre of short but nearly uniform length is obtained. These fibres are mixed with wool or other suitable material, and then felted, so as to produce a fabric, sheet or, bat. The cottony substance obtained from the eriophorum may also be used for felting, or for the manufacture of paper, for which latter purpose the finely divided fibres of the scirpus or rush is well adapted and requires very little preparation.

[*Printed, 4d.* No Drawings.]

A.D. 1860, August 6.—No. 1898.

SEITZ, Adolph Julius.—(*A communication from Adolph Seitz.*)—(*Provisional protection only.*)—"An improved "manufacture of artificial sulphate of baryta."

"I bring in together sulphate of baryta and coals, and "run in the chlorine still liquor (refuse in the manufacture "of bleaching powder) of which the acid excess is neutralised "with witherite (natural carbonate of baryta), after having "been drawn it forms a solid ball composed of chloride of "barium, hyposulphide of baryta, sulphuret of manganese "and iron. These chloride of barium balls are exposed to "the air, and then dissolved in the same manner as soda balls. "This dissolving process produces a moderately clear and "pure liquor of chloride of barium, which can be purified in "the simplest manner. After having purified and settled this "liquor of chloride of barium, I add suphuric acid, and form "in this manner a fine precipitate of sulphate of baryta, and "leave weak muriatic acid. The sulphate of baryta, after "having been settled and washed, is formed by sack sifters or "other suitable means into a soft consistent matter, with "about 30 per cent. of water."

The artificial sulphate of baryta thus produced is useful, among other things, "in the manufacture of all sorts of "paper and paper hangings, instead of sulphate of lime "(artificial)."

[Printed, 4*d*. No Drawings.]

A.D. 1860, August 10.—No. 1942.

MIDDLETON, Samuel. —(*Provisional protection only.*)— "Improvements in combining and preparing surfaces of paper and other materials for the purpose of preventing "forgery or fraud in the manufacture of banknotes, cheques, "bills of exchange, or other valuable documents."

The invention consists in combining and preparing the surfaces of paper and other materials used in the manufacture of bank notes, cheques, &c., so that they cannot be split, photographed, or imitated by other means, without being readily detected. In place of printing the whole of the writing or device in one or more colours upon the front surface of the *banknote, cheque, &c.*, one portion of it is printed upon one piece of thin paper, and the other portion of the writing or device upon another, and the two cemented together by gutta percha, india-rubber, or other suitable cement; or a very thin sheet of gutta percha, or india-rubber, or their compound, is placed between the two pieces of paper with one portion of the writing or device on the interior surface, and by the application of heat and pressure united with them; that portion of the writing or device on the inner surface will show through, and by correctly registering with the printing on the external surface will make up the entire device, or the external portion of the writing or device may be printed or written after the separate parts are combined.

[Printed, 4*d.* No Drawings.]

A.D. 1860, August 17.—No. 1993.

MIDDLETON, William, and FOX, Daniel.—(*Provisional protection only.*)—"Improvements in machinery or apparatus "for making paper."

"We dispense with the bowls technically called 'press bowls,' "passing the pulp by means of the ordinary felt or leading apron "direct from the coucher to the drying cylinder, which passes "it over one or more other drying cylinders to the ordinary "calender. By this arrangement we dispense with the usual "rquisite gearing, and the manipulation necessary for delivering it from one roller to another, the whole motion "being given from the first moving power, and conveyed "or connected by toothed wheels."

[Printed, 4*d.* No Drawings.]

A.D. 1860, August 18.—No. 2002.

TIDCOMBE, George.—(*Provisional protection only.*)—"Improvements in hydrostatic presses."

This invention relates to a peculiar construction and arrangement of an hydrostatic press, applicable to the pressing of "half-stuff" pulp in the manufacture of papier mâché, and generally of any moist or soft substance. The box containing the substance to be pressed is of wrought iron, in the form of a solid ring, or a rectangle with rounded corners, or other convenient shape, but without any door or opening *for the extraction* of the compressed material or cake. This box, which is without top or bottom, is laid upon the table of the hydrostatic press, and the "half-stuff" or other substance to be pressed is placed within it. The table is now made to rise, and the material in the box is forced against a projecting plate on the head of the press, whereby it becomes compressed, and the liquid or moisture discharged. The box is connected to a counterweight so as to hold it down. The table of the press is now allowed to descend, and in doing so it draws the compressed cake along with it out of the bottom of the box which remains fixed. The table having descended sufficiently far to admit of the cake being removed easily therefrom, the counterweight is released, and the box descends again on to the table in readiness for another charge.

[Printed, 4*d*. No Drawings.]

A.D. 1860, August 18.—No. 2004.

HOUGHTON, FREDERICK BURNETT.—"Improvements in the " manufacture of paper when the straw of wheat, barley, " oats, rye, or rice is employed."

It having been observed that when using alkaline solutions, if very high degrees of heat and pressure be employed, very advantageous results may be obtained, and that the alkaline solutions, with a comparatively small addition of fresh solution, may be again and again used with fresh quantities of the straws above mentioned—the invention consists, first, in employing, when acting on such straws, an alkaline solution of a strength of from 3° to 4° Beaumé, at a temperature of about 378° Fahrenheit, at a pressure of from about 150 lbs. to 185 lbs. on the square inch.

2. Applying the caustic alkaline solutions which have been previously used for acting on flax or hemp or other like woody fibres of a strength exceeding 5° of Beaumé (and which are no longer capable of acting on like fibre) to act on the straw of wheat, barley, oats, rye, or rice, in combination with the high pressures and temperatures above mentioned.

3. Repeatedly using the alkaline solution above mentioned on successive quantities of fresh straw, adding each time about half the original quantity of the solution, such repeated use being made in combination with the high temperatures and

pressures above mentioned. The alkaline solutions thus repeatedly used are then evaporated to obtain the alkali.

The apparatus used in carrying out the invention is that described in the Specifications of Houghton's Patent (No. 467), dated the 17th February 1857.

[Printed, 4*d*. No Drawings.]

A.D. 1860, August 22.—No. 2019.

CLARKE, Henry Martyn. — (*A communication from Joseph Jordan, junior.*)—" An improved machine for grinding " and reducing paper stuff to pulp, and sizing the same."

The invention consists in constructing either grinder in sections, and with its knives so arranged that those of one section or series shall be so generally or wholly out of range with those of the next series, that each channel between any two next adjacent knives of one series may, at its end next adjacent to the other series, enter into two or more of the channels of such series. Also, in making the conical grinder with its knives arranged in two or more series, extending around the grinder, and at greater distances apart from one another at the smaller end of the grinder than they are at its larger end. Also, in an improved mode of applying an adjusting screw to the male grinder shaft. Also, in constructing the discharging end of the case or female grinder with a series of apertures arranged at different altitudes with respect to each other, and for the proper adjustment of the eduction pipe. Also, arranging each knife of the female grinder or outer shell at an acute angle with the curved inner surface thereof.

[Printed, 10*d*. Drawings.]

A.D. 1860, September 4.—No. 2133.

WHEELER, George Printy.—" An improved mode of, and " apparatus for, preparing half-stuff for paper makers."

The invention consists in the use for this purpose of flax, straw, flax waste, hemp, bagging, surat, straw, shoves, and the sweeping of hemp and flax mills. These having been chopped into suitable lengths and sizes, and devilled to separate the dust therefrom, are placed in a boiler, and submitted to the action of a boiling solution of soft soap and crude potash or soda. The vessel is then closed air-tight, and steam turned in, keeping up the pressure until thorough maceration of the vegetable fibres has been effected, and the silica and other extractive matters, are dissolved. A pipe leading from the closed vessel to a cistern above is then opened, and the liquid from the boiler forced up into it by the pressure of the incoming stream. The macerated materials are then removed from the boiler to the rag engine, where they are washed and reduced to half-stuff.

For bleaching, a barrel with longitudinal projecting ribs on its inner periphery is mounted horizontally immediately over a receiver. The bleaching agent is placed with the half-stuff in the barrel, which is then closed. The barrel is made to rotate and keep continuous agitation until all the fibres have been sufficiently acted upon by the bleaching liquid. The contents of the barrel are then discharged on to an angular perforated false bottom in the receiver below. The bleaching liquor, still to a great degree unexhausted, is allowed to run into a tank below, whence it may be pumped up into an elevated tank to be used again with the addition of fresh liquor. The half-stuff is then treated in the ordinary manner to effect its conversion into paper.

[Printed, 10*d*. Drawings.]

A.D. 1860, September 4.—No. 2135.

SOUTHBY, ANTHONY.—(*Provisional protection only.*)—"Im-" provements in the manufacture of paper."

The invention relates to a novel mode of treating plants in the green state, for the purpose of obtaining from them fibres suitable for making paper. The plants preferred are such as yield a juice, for instance, gorse or furze, mallows, tares, and various leguminous plants; they are submitted while in the green state to heavy pressure, by passing the plants between rollers, whereby the watery particles or juices of the plant will be expressed. The fibres are then washed so long as water will dissolve anything out of them; they are then treated with lime water or milk of lime, and again washed, after which the fibres are bleached with a solution of chloride of lime. If thought advisable, the fibres may be again washed in lime water, in order to take up the free chlorine, and the caustic lime may be neutralized by passing a stream of carbonic acid gas through the vat. The fibres will then be ready to be converted into paper in the usual way.

The above mode of operating upon the woody fibres of green plants may be used for operating upon the dry fibres of jute, gunny, and other analogous foreign plants, the essence of the bleaching process consisting in gradually and gently operating upon the fibres, instead of submitting them to the energetic and powerful action of strong chemical bleaching agents.

[Printed, 4*d.* No Drawings.]

A.D. 1860, September 6.—No. 2157.

HERRING, GEORGE, and LICHTENSTADT, DAVID.—(*Provisional protection only.*)—"Improvements in treating a "certain substance to obtain textile fibres and materials for "paper-making, and charcoal for gunpowder, pyrotechnic, and "other purposes."

The substance referred to is the bark of the mulberry tree, or of the morri family. The bark is prepared by passing it, after it has been dried, through fluted rollers of varying grooves, by which it gets freed from the outside bark, and most of the silicates, &c., inside the bark; after this it is boiled in a solution of caustic soda, and washed in warm water, in which a solution of resin soap is suspended. After the fibre is well cleansed it is washed in cold water, and when half dry is passed through a solution of bisulphate of soda, by which it acquires a white colour, and is nearly bleached. This can be used as half-stuff for paper-making.

[Printed, 4*d.* No Drawings.]

A.D. 1860, September 8.—No. 2176.

HERBELOT, ARMAND LOUIS ANDRÉ.—(*Provisional protection only.*)—"An improved method of manufacturing paper from "wood."

The invention consists in manufacturing shavings, sawdust, and fragments of wood into paper by subjecting them to the three following consecutive operations:—1. Causing them to imbibe water by immersion, or by pouring water on them. 2. *The trituration of* the moistened wood by mallets, hammers, or rollers. 3. Bleaching of the pulp obtained after trituration by chloride of lime or other bleaching agent. The bleached pulp, by itself or mixed with rag pulp, then undergoes the ordinary treatment for converting pulp into paper.

[Printed, 4*d*. No Drawings.]

A.D. 1860, September 11.—No. 2197.

CLEMO, EBENEZER.—(*Provisional protection only.*)—"An "improved mode of manufacturing stock for paper from "strand and other vegetable substances."

The invention consists in the successive employment of hydrate of soda or potash, or hydrate of lime, nitric acid, and hydrate or carbonate of soda or potash, in the conversion of straw into paper pulp. The straw, whole or chopped, is first placed in a large wooden vat, well pressed down and covered with milk of lime (five cwt. to the ton of straw), or with a solution of caustic soda or potash, 100 lbs. to the ton, and the whole boiled for about three hours. The straw is then thoroughly washed and placed in a second vessel, where it is covered with a mixture of nitric acid and water, in the proportion of about sixteen parts of water to one of acid, or of a strength of about 2° Beaumé. It is then digested at a temperature not exceeding 200° Fahrenheit, until the straw is perfectly soft and readily reducible into pulp. It is then removed into another wooden vessel, in which it is subjected to the action of a weak solution of caustic alkali, until the whole is thoroughly reduced to a fine fibrous pulp, after which it is washed, and being bleached "by any of the process in common use," is ready for working into sheets on the machines.

[Printed, 4*d*. No Drawings.]

A.D. 1860, September 15.—No. 2249.

BARNWELL, STEPHEN, and ROLLASON, ALEXANDER.—"Improvements in combining and mixing certain solutions of "pyroxylene with animal, mineral, and vegetable substances, "by which its quality is altered in such manner as to produce "hard, resistent, adhesive, plastic, or resilient compounds and "articles unalterable in their nature and varied in colour, "which said compounds, in a state of solution, may also be "*advantageously* employed as paints or varnish."

Pyroxylene is dissolved in "any of its known solvents," and oils, vegetable, animal, or mineral, added thereto. To this mixture may be added gums, resins, oxidizable salts, such as oxide of manganese or oxide of copper as colouring agents: chloride of calcium and iodide of cadmium, are useful when articles of an uninflammable nature are to be produced. The compound may be strengthened with glue, gelatine, wool, flock, &c. The material resulting from these combinations is applicable to the manufacture of a variety of articles; cups, bowls, tubes, &c., are made by coating textile fabrics with this solution, then cutting such fabric out into the desired shape, and afterwards cementing the edges; or the raw material of such textile fabrics may be saturated with the solution, and from this various articles may be produced. In the solid form, in sheets, it is useful for bookbinders and fancy box makers and for many other purposes.

[Printed, 6*d*. No Drawings.]

A.D. 1860, September 21.—No. 2299.

RICHARDSON, THOMAS.—(*Provisional protection only.*)—"Improvements in the treatment of bones and in the manufacture of paper."

The chief object of the invention is to obtain from bones a diphosphate or subphosphate of lime in the state of a fine white powder or precipitate suitable for being employed in the manufacture of paper in lieu of sulphate of lime or other white powders, rendering the paper smoother and generally of better quality. The apparatus employed consists of one or more towers or columns filled with bones, supported on stages at intervals therein. The bones are previously washed in lime water and the larger ones are broken. A stream of sulphurous acid gas is caused to pass through the towers. The towers are supplied with a current of water or of weak solution, which, meeting the sulphurous acid, absorbs it and dissolves out the earthy matter of the bones. A portion of the lime in the bones combines with the sulphurous acid, bearing a diphosphate of lime which (although insoluble in pure water) is soluble in a solution of sulphurous acid. The fine white powder thus obtained is mixed in the ordinary manner with the paper pulp.

[Printed, 4d. No Drawings.]

A.D. 1860, October 8.—No. 2442.

GARDNER, Edward. — "Improvements in machinery or "apparatus employed in the manufacture of paper."

The invention relates to a peculiar construction and arrangement of the "knotter," and consists in the employment of a vessel or vat, in the interior of which is a strainer, the perforated or straining surfaces of which are in a vertical or nearly vertical position.

These straining surfaces are combined with closed ends, so as to form a hollow receptacle with perforated or slotted sides. This receptacle or strainer is connected to a vibrating or rocking shaft, from which it receives a constant oscillating or vibratory motion by any suitable mechanical contrivance. A diaphragm of vulcanized india-rubber, leather, or other suitable flexible material, serves to connect the upper edge of the vibrating strainer with the sides of the vessel or vat, so that whilst perfect freedom of vibration is allowed to the strainer, all communication between it and the vat is closed, excepting through its perforated or slotted sides. The pulp, after leaving the "stuff chest" or "lifters," enters the vessel or vat of this improved "knotter" and percolates through the perforated sides of the strainer, after filling which it flows over the edge in a fit state to be manufactured into paper. In the feed pipe, which supplies the pulp to the vessel or vat of the "knotter," is fitted in some cases a self-closing valve, which acts in such a manner that when the strainer is vibrated, it will effectually prevent or check the tendency which the pulp may have to flow back or rise in the feed or supply pipe.

[Printed, 10*d*. Drawings.]

A.D. 1860, October 11.—No. 2479.

HANON, Etienne Joseph.—"Improvements in the manufac- "ture of vegetable albumine."

The invention consists in an improved mode of manufacturing vegetable albumen from gluten, which is said to be applicable (among other purposes) as sizing for paper. "It is well known "that gluten is obtained by kneading wheat flour paste with "water; during the operation of kneading, the feculent part "of the paste is carried off with the water, and the glutinous "*parts are united* and form an elastic substance called gluten,

" which contains about twice its weight of water; the gluten
" in this state is converted into vegetable albumine by the
" process of fermentation. This process is stopped at the point
" when the gluten has undergone such modifications as ren-
" der it fit for the various purposes to which it may be
" applied, after it has been dried in moulds or otherwise
" as may be found most convenient."

[Printed, 4*d*. No Drawings.]

A.D. 1860, October 16.—No. 2520.

JULLION, John Louis.—(*Provisional protection only.*)—" An improvement in the manufacture of paper."

The invention relates to a novel or improved preparation for sizing paper, and consists " in the use of an easily fusible " resinous soap for engine sizing instead of the aluminous " soap at present employed. A variety of salts may be used " for this purpose, but for their cheapness and fusibility I " employ, by preference, either sulphate of zinc or sulphate " of alumina and zinc."

[Printed, 4*d*. No Drawings.]

A.D. 1860, October 18.—No. 2538.

MARSHALL, Thomas John.—" Improvements in the manu-" facture of paper, and in machinery or apparatus for effecting " the same."

The invention relates to the more effectual separation of grit, knots, and other impurities from the pulp, and consists in an improved apparatus and process for causing it to pass, in a dilute fluid state, outwards from the interior of a cylin-" drical, octagonal, drum, barrel, or other shaped vessel, made to " rotate " round its axis through a series of apertures, slits, or perforations on the surface of the said cylinder or vessel, the purified pulp being collected in a vat, trough, or other suitable vessel, to be conducted on to the " making " machine. The pulp or stuff to be strained being led or conducted into the revolving cylinder or drum at one end of the same, is propelled gradually through the same by means of an archimedean screw or spiral vanes or ribs, by which the pulp is conducted over the entire inner surface, the finer fibres getting away through the apertures, slits, or perforations, whilst the refuse is conducted to the other end of the cylinder.

[Printed, 8d. Drawings.]

A.D. 1860, October 18.—No. 2545.

JULLION, John Louis.—(*A communication from John Hoyt.*)—"Improvements in paper-making machinery."

The invention relates to a novel arrangement of machinery for supplying pulp to the paper-making machine, and has for its object to supply this material at all times in proper quantities dependent upon and in proportion to the speed at which the machine is driven, and thus produce paper of uniform thickness. For this purpose an elevating apparatus is adapted to the pulp vat, and is driven by gearing connected with some of the working parts of the machine, so that at whatever speed the paper-making machine itself may be driven the elevator will be driven at a proportionate speed. A self-acting valve, provided with a float, is also adapted to the pulp vat or cistern for the purpose of maintaining the pulp at one uniform level. Various kinds of apparatus for raising or elevating the pulp may be employed, but the most convenient arrangement for the purpose will be either an archimedean screw, or an endless chain of buckets, but care must be taken that the pulp be not delivered to the machine in splashes, but allowed to run gently to the wire.

[Printed, 6*d*. Drawings.]

A.D. 1860, November 3.—No. 2693.

DURHAM, William.—"Improvements in preparing materials for the manufacture of paper."

The invention relates to an improved system of preparing rags, &c. for the manufacture of paper preparatory to the washing and bleaching processes. The rags, &c., are first boiled in a solution of lime, in the proportion of from 6 lbs. to 12 lbs. of lime to each cwt. of paper material. The lime is added to a quantity of water sufficient to cover the rags, &c., when placed in the boiling vessel. When the rags, &c., have been boiled a sufficient time the liquor is run off, and clean water is run through the materials. The rags, &c., are next boiled in an acidulous solution for one or two hours.

The solution is prepared by adding commercial vitriol or muriatic acid to water in the proportion of from 1 lb. to 3 lbs. of acid to each cwt. of the paper-making material. A sufficient quantity of the solution is made to cover the contents of the boiler. When the boiling is completed the acidulous liquor is run off, and clear water is allowed to flow through the materials. At this stage some qualities of rags are ready for washing, but it is advisable in most cases to continue the operation to the next and last stage, which consists in boiling the rags, &c., with an alkaline solution. This solution is made by adding from ½ lb. to 1½ lb. of soda ash to each cwt. of the paper-making materials, and a sufficient quantity of water to cover the materials. After boiling in this solution for three or four hours, the liquor is run off, and clean water is allowed to flow into the boiler. The rags, &c., are then ready for the washing and bleaching processes. The quantity of the chemicals, as well as the time required for boiling, must be varied according to the quality of the rags, &c.

[Printed, 4*d*. No Drawings.]

A.D. 1860, November 7.—No. 2734.

RENNEL, PAUL WALKER.—"Improvements in the method "of, and apparatus for, treating green, semi-green, or undried "vegetables or plants in order to reduce their fibrous portions "to a pulp, and also in the application of the said pulp, when "so made, to the manufacture of paper."

"I propose to make use of, for the purpose of making "paper pulp green, semi-green, or undried fibrous vegetables "or plants, in contradistinction to the practice hitherto "adopted of using the plants in a dried state, after the silica "or other hardening principle is matured in them, thereby "rendering them difficult of solution."

The class of plants used are ordinary grasses, hay, broom, "and such like. Having first thoroughly washed and steeped "the plants to be operated upon, I boil them in a weak "alkaline solution; I then disintegrate their fibres one from "another by putting the softened plants through a pulping "machine, which consists of one or more pairs of rollers, "either of the same or slightly different diameters, between "which they pass. In order to decolourize the pulp, I bleach "it with the usual bleaching ingredients."

[Printed, 4*d*. No Drawings.]

A.D. 1860, November 14.—No. 2797.

REEVES, John Fry.—"Improvements in the manufacture of "paper."

The invention consists of an improved mode of treating jute and other similar fibres so as to convert them into first-class paper pulp. The fibres are separated in a dry state, and reduced into small filaments by means of a tearing wheel going at great speed, having small feeding rollers finely grooved lengthwise, fixed close to the tearing wheel, and revolving at much less speed. After passing through a dusting machine or willow, the fibres are boiled in an alkaline solution of adequate strength, until the free colouring matter is extracted. After being well washed, the fibres are treated in a weak solution of chloride of soda or lime, or both, gradually introducing steam into the vat; the fibres are then immersed in a bath of chloride of lime of moderate strength, and a small quantity of diluted sulphuric or hydrochloric acid; the addition of the acid must be gradual, and made with caution; the fibres are next boiled in a weak caustic alkaline solution, by means of which combination a large quantity of colouring matter will be extracted, after which the fibres should be well washed; the fibres are then treated in a solution of chloride of soda or lime, or both, of moderate strength, and a perfect white will be the result, after which the fibres are washed until all the chlorine is removed.

[Printed, 4*d*. No Drawings.]

A.D. 1860, November 16.—No. 2825.

DAHMEN, Mathias Antony Joseph. — "Improvements in "treating vegetable fibrous substances in the manufacture of "paper."

For these purposes, tow, the waste of flax, hemp, and other vegetable fibrous substance are steeped in cold liquids, which are caused to ferment for some hours. The fibrous substance s then removed, and placed in an open vessel in water, together with sufficient soap and soda or potash, to cleanse the fibres by boiling. The fibrous substance having been thus boiled and cleansed, is then immersed in a solution of caustic alkali, such as soda, for some hours, after which the fibrous substance is to be thoroughly washed in clean water. The fibrous substance is then converted into pulp in the ordinary manner.

[*Printed, 4d.* No Drawings.]

A.D. 1860, December 8.—No. 2961.

RICHARDSON, THOMAS.—"Improvements in the manufacture of paper."

The invention consists in mixing with the paper pulp (whether the same is made from rags or other materials) diphosphate of lime, or certain other precipitated compounds of phosphoric acid and lime or magnesia or other bases, either alone or together with sulphites. Diphosphate of lime for this purpose is obtained by treating bones, bone ashes, or other suitable phosphatic material with sulphurous acid, as described in the present patentee's Specification No. 703, A.D. 1860, which, however, does not belong to this series of Abridgments. The solution of diphosphate of lime in an aqueous solution of sulphurous acid is evaporated or heated until the diphosphate of lime is precipitated as a fine white powder, which is employed for mixing with the paper pulp. The diphosphate of lime thus prepared contains more or less of sulphite of lime which may be allowed to remain in it. "Instead of evaporating " the aforesaid solution of diphosphate of lime in aqueous " sulphurous acid, I sometimes add to it lime water, or pure " hydrate of lime, or the carbonates of lime, and I then ob-" tain the bone, earth, or triphosphate back again, more or " less mixed with sulphite of lime; I can also substitute in " lieu of lime alkalies, magnesia, strontia, or baryta. In " either case I obtain a fine white, precipitated powder, which " I employ for mixing with the paper pulp, as herein-before " mentioned."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 11.—No. 3038.

TOWNSEND, JOSEPH, and WALKER, JAMES.—"Improve-" ments in treating bye-products arising in the manufacture " of soda and potash for the obtainment of antichlores and " other useful products."

The invention relates to the utilizing of the bye or waste products resulting in the manufacture of the carbonates of potash and soda with a view of obtaining a peculiar product called "precipitated antichlore," also certain alkaline and earthy sulphites and hyposulphites and sulphur and oxides of manganese, such substances to be employed as antichlores in the manufacture of paper, as bleaching agents for woollen or other animal fabrics, or straw, and as purifiers in the manufacture of sugar, &c.

[Printed, 6*d*. No Drawings.]

A.D. 1860, December 28.—No. 3182.

NEWTON, William Edward.—(*A communication from Heinrich Voelter.*)—"Improved machinery to be used in "the manufacture of paper."

The invention relates to an improved means of reducing, by the wet method, wood, fibres, or fibrous substances, for the manufacture of paper, pasteboard, paper pulp, papier mâché, or other analogous substances, and consists: 1. In the employment of grinding surfaces, so prepared and arranged that the fibrous substance may not be reduced to a pulverized state between the grinding surfaces, but may issue from the mill in a fine and clean state, and consequently be much easier to mix and convert into pulp than heretofore. 2. In an improved apparatus for separating the fine from the coarse and unreduced fibre, and also in the means of collecting the reduced fibres, and conducting them to proper receptacles.

The principal features of the apparatus employed are a combination of separating, refining, and purifying cylinders, and their accessories, with one or more reducing mills for reducing the wood or other substances suitable for the manufacture of paper. These cylinders are hollow drums, covered with metallic gauze, and mounted in suitable bearings in vats, which are supplied with the material to be operated upon. The fine fibres pass through the gauze covering of the cylinders, and are discharged from the ends of the cylinders and conveyed away through suitably arranged pipes or channels.

2. The construction and use of a rotating or turning case or scoop, which is self-acting, and is provided with a rake or scraper for collecting and removing the coarse fibres or residuum from the manufacture, and discharging it into suitable receptacles.

3. The use of a drawing-off and distributing apparatus, consisting of a cylinder provided at its circumference with screw threads, and combined with a rotary wiper for keeping up the *circulation of the* fibrous mass.

4. The employment of two or more grinding surfaces, either in a horizontal or vertical position, one half moveable and the other fixed, for the purpose of reducing between their surfaces any of the substances that may be used in the manufacture of paper, pasteboard, or analogous substances.

[Printed, 10*d*. Drawings.]

A.D. 1860, December 29.—No. 3188.

ST. CYR, Jean Lafon, GRIGNON, Auguste Joseph, and ROME, Philippe. — (*Provisional protection only.*) — "Im-
" provements in manufacturing fibrous materials, tissues, or
" other fabrics."

"The invention consists in reducing the pizzle or genital
" parts of bulls or oxen into a fibrous state, either by beating,
" pressing, rolling, or any suitable means, and afterwards
" spinning the said fibres alone or mixed with other suitable
" materials, such as flax, hemp, cotton, silk, wool, or others, and
" form yarns therefrom, from which yarns any suitable tissue
" or fabric may be manufactured if required, with the addition
" of yarns made of any other suitable textile material. The
" fibres obtained from the said pizzles may also be applied to
" the manufacture of paper, card, or pasteboard, by being
" mixed in any suitable proportion into the ordinary pulp from
" which the latter were hitherto made."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 29.—No. 3190.

VILCOQ, Laurent Charles Marie Joseph. — "Improve-
" ments in apparatus or machinery for triturating textile bodies
" and other substances."

The invention consists of a cast-iron drum, which has its outer surface serrated or fluted, the size, depth, direction, or rake of the flutings being governed by the speed at which the drum is driven. Beneath this drum is placed an apparatus formed of small plates placed one against the other, and serrated on the upper surface, forming a segmental arc nearly concentric with the drum. The extremity of each plate is supported by means of a link chain, and balanced by weights passing over pulleys fixed to the frame of the machine. Each plate has projections on its extremities, which fit into corresponding notches in the said chain. The object obtained by the suspension of this serrated segment is the regulation of the space between it and the exterior of the drum, so that the teeth, flutings, or projections may never come into contact. The fibrous matters to be ground are introduced on the one side of the drum by means of an endless band travelling on rollers. Another small serrated segment surrounds the drum at the point where the materials are received, and the segment is arranged so that the one end turns on a hinge, thus allowing the other to be more or less opened; a vibratory motion is given to this last segment by means of an eccentric or cam on the axle. To facilitate its action on the plants, the machine is placed in a tank of water.

[Printed, 8*d*. Drawings.]

1861.

A.D. 1861, January 3.—No. 16.

DOFFEGNIES, HENRY.—(*Provisional protection only.*)— "Improvements in the process of obtaining pulp for the "manufacture of paper from Indian corn and other similar "plants."

The stalks, leaves, chaff, and also the unripe and unsound grain are sorted into different lots according to their qualities. The lot intended to be converted into pulp is then chopped into small pieces with a chaff-cutter, and afterwards subjected to a severe thrashing for the purpose of removing the sand and dust. The matters are then washed and pulped in any suitable manner until the water at the outlet of the wash-board is perfectly limpid. The washing is then discontinued and a solution of soda added, after which the pulping is slowly continued for about an hour, and then washed in an abundance of water, and when well drained the pulp remains. The pulp is then macerated for about twelve hours in a solution of chlorine for the purpose of bleaching, and then returned to the washing and pulping machine to extract the chlorine, the result of which is a white pulp from which the paper can be manufactured in the ordinary manner. When the stalks of the plant are selected for making the pulp, it will be necessary to give the mass a second washing and pulping in a solution of soda.

A second process is as follows :—After the aforesaid matters have been thrashed, they are placed in a boiler with caustic lye, with or without pressure. When the mass has been acted upon by the lye, so as to be soft and soapy to the touch, it is placed in the pulping machine and operated upon in the same manner as described in the first process.

In another process, the matters after they have been washed and softened in the caustic lye are strained, and then placed for some hours in a case or box containing chlorine gas, after which they are placed for about twelve hours in a bath holding chlorine in solution. The mass is then passed to the washing and pulping machine, and acted upon as described in the first and second processes.

[Printed, *4d.* No Drawings.]

A.D. 1861, January 5.—No. 28.

COURTAIS, Pierre, and JAMMET, Fortuné.—"Improvements in the manufacture of paper and pasteboard."

The invention relates to the manufacture of paper, cardboard, millboard, and other similar articles by the employment of seaweed. Among the advantages attendant upon the employment of this substance, the following may be mentioned :—First, simple washing with water is sufficient to dissolve any salt which this substance may contain. Second, the stalks and leaves of seaweed are of a very pure nature, and the employment therefore of this substance is calculated to improve the quality of the paper which is manufactured from it. Third, seaweed is an incorruptible matter, which is not acted upon even by lime, and which after being buried in the ground for many hundred years, has been found on being dug up from several yards depth, to be in a perfect state of preservation. This property will be found of great utility when the paper or millboard is employed for the sheathing or coating of ships or vessels, the material now used for that purpose being liable quickly to decay and leave wrinkles or cracks injurious to the vessel, whilst by the employment of the seaweed an article will be produced, the liability of which to decay will be diminished in proportion to the quantity of seaweed which enters into its composition. Fourth, this substance is found all over the world where there is a sea-shore; the supply is exhaustless, and only requires to be gathered, which labour may be easily performed by young children. Fifth, the manufacture may be carried on by means of the apparatus ordinarily employed for that purpose, and considerable economy is effected in the cost of the product.

If the stalks are used, they are steeped in water for a suitable time, in order to soften them and allow of their being more readily crushed by the engine. If the leaves are employed, they are to be triturated without any other preparation. "The seaweed, whether stalks, or leaves, or both, are to be "supplied to the engine in equal proportion with the rags, or "fifty per cent. of each, and although we have not found it "necessary to wash the weed or to employ size in the manu-"facture, there is no doubt that the quality of the product "would be improved by these additions.

"All the other operations are conducted in the ordinary "manner of manufacturing paper or cardboard from rags."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 2.—No. 282.

CLARK, WILLIAM.—(*A communication from Louis Gaucher and Auguste Sommé.*)—"Improvements in the manufacture "of paper pulp."

The invention consists in the employment of tanners' waste, such as spent tan and varec (sea weed), which are submitted to various preparatory processes. The waste tan, as taken from the tanneries, is submitted to a washing operation in water, and then to the action of pestles, after which it is subjected to the action of leys with the addition of a jet of steam, after this it is again washed in water, and subsequently reduced to fibre and bleached with chloride of lime; lastly, it is submitted to a third washing in water to remove the traces of the chloride of lime. The varec (or sea weed) after undergoing these several operations, is macerated in water for twelve hours, the reduction of the fibre is then effected, and is now submitted to the action of the soda ley, and a further final reduction of the fibre is effected, the bleaching by chloride of lime then takes place, and lastly, a washing in water. Varec, or sea weed thus treated, furnishes a beautiful white pulp, which is mixed in various proportions with the waste tan to form the new pulp for paper, cardboard, and other forms of paper stuff. To obtain a paper of greater strength and consistency a small quantity of ordinary paper pulp may be added to the mixture.

[Printed, 4*d.* No Drawings.]

A.D. 1861, February 9.—No. 330.

JULLION, John Louis.—"Improvements in the treatment "of soda waste and sulphurets."

The connection of this invention with the present series consists in the fact that the lime is precipitated with sulphuric acid in the form of sulphate, such as is sold to paper-makers under the name of pearl-hardening.

The invention consists in the treatment of soda waste or sulphuret of calcium and other sulphurets of a like character in order to produce useful products therefrom, it being proposed to boil or otherwise heat the sulphurets with powdered magnesia, limestone, or a silicate of magnesia, in order that the sulphur may combine with the magnesia to form a soluble compound and thus render it available for ordinary uses.

In carrying out the invention two different methods may be employed, by one of which the operator is enabled to avail himself of either the sulphur alone that is contained in the waste, or both the sulphur and a base at the same time.

[Printed, 4*d.* No Drawings.]

A.D. 1861, February 11.—No. 347.

BROOMAN, Richard Archibald.—(*A communication from Michel Chominot and Picard.*)—(*Provisional protection only.*)—"Treating the tobacco plant in order to manufacture "paper."

The important point in this invention is gathering the juice which escapes through the metal cloth employed in the manufacture of the paper to apply on and enrich the pulp with its aroma.

The ribs, root, &c., of the tobacco plant and tobacco waste, mixed or separately, are placed in a vessel which is then filled with cold water, so as to absorb all the albuminous matters, nicotine, nicotianine, nitrate of lime (*nitrate de chaux*) acetic acid, nitrate, muriate, and sulphate of potash, chloride and phosphate of lime. After soaking some hours, the tobacco is removed and a fresh supply placed in the water. This operation is repeated until the water has become saturated and ceases to absorb the matters above named.

2. The tobacco treated as aforesaid is distilled by any ordinary means, the essential oil extracted, and carefully preserved.

3. The saturated water from the first operation is evaporated under heat down to the consistence desired, in some cases, to a resinous state, which is used for colouring matter.

4. A vessel is about half filled with water to which is added, at the choice of the operator, vegetable alkalies, potash, mineral alkalies, soda, animal alkalies, or ammonia in a liquid or solid state. The operator selects at will soda, nitrates, muriates, acetates, carbonates and bicarbonates, borates, hydrochlorates, citrates, oxalates, and tartrates of soda, of potash, of ammonia, of lime, or of alumina, alcohol, quick or slack lime, also the following acids :—Acetic, antimonic, boracic, carbonic, citric, hydrocyanic, oxalic, hydro-sulphuric, sulphuric, tartaric, nitric, and muriatic, also the salts and crystals of soda, effervescing soda, salts of tartar and ammonia, sea salt, salts of nitre, of sorrel, and Glauber salts, and chlorides of sodium, of potassium, of ammonium, of lime, or of aluminum. When sufficiently boiled the water is run off, and the tobacco is worked until it is left in a state of pulp.

[Printed, *4d.* No Drawings.]

A.D. 1861, February 14.—No. 377.

DEVLAN, Patrick Sarsfield.—" A new and useful bearing " surface for all kinds of journal and axle boxes."

The invention consists in the use and application of the pulp employed for making paper for boxes and bearings of journals, as a substitute for the various metals, alloys, and compositions used for such purposes. It may be used alone or mixed in combination with plumbago, plumbaginous substance, plaster, or other suitable material, by means of gum shellac or other gum, and moulded when wet into form by pressing it into the stands or iron boxes, or other convenient way, as in casting Babbit metal boxes, and allowed to dry.

[*Printed, 4d.* No Drawings.]

A.D. 1861, February 16.—No. 391.

BARRÉ, Ernest Henry, and BLONDEL, Charles Mary Joseph.—"The manufacture of paper from a pulp obtained "from wood and all other vegetable produce of a woody "nature by means of the isolation of the cellular fibres."

The "entire secret" of the invention consists in isolating or separating the cellular tissue of wood and ligneous plants, which decomposition being effected, and several washings having taken place, a brown pulp is obtained, more or lest fine according to the greater or lesser degree of preparation which it has experienced. The wood is cut into thin pieces, which are placed in a closed receptacle in contact with an equal weight of the nitric acid of commerce and left in maceration from twenty-four to thirty hours, according to the hardness of the wood. Cold water, four times the weight of the nitric acid used, is then added, and the whole boiled until the wood disintegrates easily. The nitric acid is then saturated with a sufficient quantity of carbonate of soda. "The pulp thus "prepared will require several washings to clear it entirely "from the nitric acid which it may contain, and its bleaching "will be completed by the use of chlorine and the ordinary "processes."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 18.—No. 396.

WOMERSLEY, Joseph.—(*Provisional protection only.*)—"Improvements in paper making machines."

The invention consists in causing the knotter to consist of several small troughs or grooves, in the sides of which are numerous apertures through which the pulp is strained. It is not confined to troughs or grooves with vertical sides "though "that will best answer the object in view."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 21.—No. 437.

JOHNSON, John Henry.—(*A communication from Charles Marie Gagnage.*)—"The application of certain vegetable sub-"stances to the manufacture of paper pulp, and the mode of "treating the same for that purpose."

The substances which it is proposed to employ in lieu of rags for the preparation of paper pulp are the fir tree, maritime pine, larch, and in fact all coniferæ, junipers, willows, and osiers, tamarinds, the genus spartium, or broom, and scoparia; also the genus juncus of rush and genista. Amongst herbaceous plants, those of the mallow tribe and the bursaria, as, for example, the bursa pastoris and its varieties will be found particularly serviceable, also those of the genus hedysarium, the polygoneæ and cyclamen, the panicum germanicum and tall panicum lupinus, the sorghum or millet; also those plants of the genus lepidium or pepperwort under the order cruciferæ; also the dead leaves of the haricot and pea, and of the thistle. As regards the coniferæ the collection of the fallen leaves or needles may be effected at any time. Of willows and osiers the bark alone is used, but the young green shoots of all kinds of trees and shrubs may be used entire, the shoots being cut up into short lengths by means of a machine similar to a chaff cutter, as are also the brooms, rushes, and young underwood. These fragments of plants are then submitted to the action of a bruising and tearing or disintegrating machine. The leaves of the fir and pine are treated with alkaline baths for the purpose of softening them before they are subjected to the action of the disintegrating machine, after which the mass is washed and pressed and submitted to the alternate action of an alkaline and a mineral acid bath, the strength of which is regulated according to the season or nature of the leaves or matter under treatment; after a time the leaves lose their resinous matter and retain only the woody portions, mixed with a yellowish colouring matter which is removed by mineral acid, when after being again washed and pressed, the mass is ready for bleaching "by any good process, but the special "mode preferred is by causing the chloride to pass into an "oxidized soda bath."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 23.—No. 459.

HERBELOT, Armand Louis André.—(*Provisional protection only.*)—"Machinery for reducing wood into chips or "shavings."

The object of the invention is to reduce wood to small chips *or* shavings, for the manufacture of paper, &c. The wood is held between chucks or centres, and rotary motion is imparted to it from a pulley on one of the shafts carrying one of the centres. The same shaft carries a collar and cam, which latter takes into and drives a toothed-wheel keyed on a vertical screw-threaded shaft, working through a correspondingly threaded hinged nut. The vertical shaft carries at its lower end a bevilled toothed wheel in gear with a similar wheel on a horizontal shaft, which at its other end communicates through bevilled toothed wheels rotary motion to a second threaded shaft, working through a hinged nut similar to the first. The threaded nuts through which the vertical shafts work are connected to a frame, carrying a saw and knife or plane. On communicating rotary motion to the driving shaft the wood revolves, and the rotation imparted to the vertical screw shafts causes the hinged nuts to rise, and thus bring the saw and knife in contact with the wood; the teeth of the saw enter the wood, and the knife slices off chips or thin shavings. The rotation of the wood is continuous, while the motion of the saw and knife is intermittent. As soon as the hinged nuts with the saw and knife bar have reached the top of the frame, the wood will have been reduced to its smallest diameter, a projection or cam on the frame comes in contact with a lever or levers, throws the cam out of gear with the toothed wheel on the vertical shaft, and stops the motion; the hinged nuts are opened, and with the saw and knife bar are lowered to the bottom of the screw shafts; the nuts are then closed, and upon a fresh block of wood being fixed between the chucks, and rotary motion being imparted to the machine, the action proceeds as before.

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 4.—No. 548.

SABEL, EPHRAIM.—"Improved apparatus to be used in the "manufacture of paper; applicable also to controlling the "motion of travelling webs and fabrics."

The invention consists of a self-acting guiding apparatus for restoring the endless cloth or wire on which the pulp, &c., travels to its true course, when from any cause it has a tendency to depart therefrom. A guide cylinder or roller is supported at one end by a fixed bearing, and at the other by a movable one. The cloth or wire passes over this roller, forming a broken line, and imparts thereto a rotary movement. A wooden rule or rod, supported at each end by levers, carries two metal blades, between which the wire or cloth passes; a small winch or handle puts the lever in motion, and this carries with or upon it a forked lever. A vertical wheel, toothed at each side, is placed so as to be acted upon by the cloth lever as the cloth travels; it cannot quit its true direction without displacing or drawing with it the wooden rule or rod, which, by means of the double armed lever, compels the lever against the toothed wheel on one of its faces. A screw then receives a rotary impulsion, and thus places the guide cylinder out of level (right or left) according to the displacement of the cloth. The guide roller will only be displaced in just proportion to the displacement of the cloth, because the forked lever does not follow the rectangle of the working apparatus, it being retained by the lever which moves only when the cloth itself is displaced. The apparatus releases itself, for the forked lever is disengaged from the toothed wheel by the displacement of the conducting roller.

[Printed, 10*d*. Drawings.]

A.D. 1861, March 13.—No. 622.

JULLION, John Louis.—"An improvement in the apparatus "used in the manufacture of paper."

The invention consists simply in the substitution for the expensive endless apron of woollen felt, usually employed in the drying apparatus in paper-making machinery, of a fabric composed of vegetable fibre, such as cotton. The cotton fabric is of considerable substance — about the substance of strong fustian or sailcloth—and in order to avoid the necessity of making a seam in the endless apron, the fabric is woven in the form of a circle or cylinder, after which the fabric is to be finished with a pile or raised surface on one side in the same manner as velveteens or fustians are now finished.

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 15.—No. 648.

GRANGER, Arthur.—"Improvements in the manufacture "of hats, bonnets, waistcoats, and trimmings for wearing "*apparel.*"

The invention relates to the manufacture of hats and bonnets from paper, and consists in shaping the bonnets from paper or paper cloth, or moulding or shaping them from paper pulp. The bodies thus prepared are then coated on their exterior surfaces with any suitable adhesive varnish (waterproof, if desired), and before such varnish is dry, woollen, silk, cotton, or other flock of any desired colour, in the form of dust or powder, is sifted evenly over the prepared surface to impart the appearance of cloth or felt to hats or bonnets so manufactured; the insides may be lined and finished as heretofore, and woven fabrics or suitable material may be applied to strengthen certain parts of such hats and bonnets where required. Bonnets so made may have ornamental designs, embossed or impressed thereon or applied thereto, or be trimmed and finished according to the taste of the wearer. Waistcoats or vests are made according to this invention, either from paper (plain or enamelled), paper cloth, cotton, or linen cloth, enamelled by the processes well known in the manufacture of enamelled paper or card; "but I prefer to employ " preparations of zinc for this purpose, such preparations not " being of an injurious nature. I cut out or form the waist- " coats or vests from either of the above materials, and emboss, " impress, or print any suitable design on the front surface to " ornament the same, and to indicate the outlines of the " pockets, button holes, stitching, or other parts, and when " paper is alone employed, the button holes, pockets, and " other parts liable to wear may be strengthened by affixing " or applying woven fabric or suitable material thereto, and " I give the appearance of cloth or felt to waistcoats or vests " so manufactured by applying varnish, and sifting flock " thereon, as before described in reference to the first part " of my invention."

In like manner trimmings for ladies' and children's dresses may be manufactured of paper, paper cloth, paper pulp, shaped, moulded or cut out of, and of various designs.

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 16.—No. 665.

DREVELLE, ADOLPHE. — "Improvements in presses for " *pressing or printing* textile fabrics."

On each side of the ordinary press is placed a moveable frame, technically called a "Jacob's ladder," to support the press plates and raise or lower them at pleasure, by which operation they are opened or closed simultaneously to allow the goods to be put on the plates, pressed and removed therefrom, the same as putting books on the shelves of a book-case, without one piece interfering with another. The simultaneously self-acting up-and-down motion of all the plates at the same time dispenses with the tedious labour of removing them separately by hand, and secures the advantage of heating and cooling the goods very quickly on account of the space left between each piece, either before or after using the press. To supply steam or hot air and water to the plates, two spiral feed tubes are employed inside two hollow pillars, or a folding apparatus acting as bellows for expanding or contracting with the up-and-down motion of the plates.

"I may also observe that in order to quicken the heating " operation, I make or manufacture cards or pasteboards with " a mixture of any suitable metallic powder, or a thin metallic " plate covered with pulp paper or pasteboard, as it is a " better heat conductor."

[Printed, 10*d*. Drawings.]

A.D. 1861, March 25.—No. 740.

MANBY, WILLIAM EDWARD.—(*Provisional protection not allowed.*)—"The manufacture of paper, linen, cotton, or other " fabrics prepared with a preparation of blue, to be used for " the purpose of washing or other purposes.

"This invention consists of a solution of indigo and other " ingredients, which I apply to paper, linen, cotton, or other " fabrics, to be used for the purpose of colouring water or " other liquids for washing, dyeing, and other purposes."

[Printed, 4*d*. No Drawings.]

A. D. 1861, April 6.—No. 851.

KNOWLES, BENJAMIN.—"Improvements in the manufacture " of papier mâché blank trays."

The invention consists, 1, in inserting or inlaying a panel of pasted paper or a panel of paper pulp in the bottom of the blank tray, the said panel being attached to the bottom of the tray by means of glue or paste or other adhesive matter. This panel constitutes the true bottom of the tray, which by this method of manufacture is prevented from exhibiting the shrivelled appearance common in papier mâché trays of ordinary manufacture; 2, in obtaining a good surface on papier mâché blank trays by coating them with a mixture of ochre or chalk, or whiting and linseed oil, or varnish and flour paste. After the mixture has been applied to the blank tray, the tray is stoved for the purpose of hardening the mixture. The surface is then smoothed down with pumice stone. This treatment is in substitution of the ordinary plan of dressing down the surface of the papier mâché itself.

[Printed, *4d.* No Drawings.]

A.D. 1861, April 11.—No. 895.

BROOMAN, Richard Archibald.—(*A communication from Leon Bertin and Pierre Carteron.*) — "Improvements in " sizing or preparing paper and textile fabrics, in order to " render them waterproof, and to increase the strength " thereof."

The invention consists in the employment of the following ingredients in the proportions specified: — Lime (200 lbs.), sub-carbonate of soda (220 lbs.), resin (594 lbs.), and gamboge (66 lbs.). When applied to paper in the state of pulp, the process is as follows:—The resinous product above described is gradually dissolved in boiling water, poured into the pulp, and well mixed with it. Small portions of pounded alum are added while the pulping engine is at work, when the resinous product becomes intermixed with the whole mass; the second product coagulates it and causes it to adhere by precipitating it to all solid parts of the mass, which it envelopes with a coating, and becomes insoluble and impervious to water after drying. The paper thus prepared is also applicable for bookbinding, and "for purposes wherewith cardboard has been " hitherto employed."

[Printed, *4d.* No Drawings.]

A.D. 1861, April 13.—No. 918.

WRIGHT, James.—(*A communication from John Boyles Murray.*) — (*Provisional protection only.*) — " Improve-

" ments in the mode of manufacturing and designing postage " letter paper, postage envelopes for letters, and postage " wrappers or covers for newspapers and other printed " matter."

The object of the first part of the invention is to embody the value of the postage stamp and the design thereof within the material of the envelope wrapper, sheet of paper, or other thing to be used, by a water-mark, instead of being stamped or embossed upon the envelope, as at present done. "I further " propose to distinguish, by means of various coloured papers, " the postage value of the envelope, wrapper, or paper, some " of the advantages derived for the adoption of my invention " being a saving of the expence of embossing, also in addition " to distinguishing the postage value of the different envelopes " by the colour indicated and embodied in the envelope of " the watermark, the business of the post office is greatly " expedited, as the defacing, dating, or denoting stamp may " be struck on any part of the envelope, hence, avoiding the " necessity of assorting the envelopes face upwards, and " always defacing the stamp alone."

[Printed, 4*d*. No Drawings.]

A.D. 1861, April 24.—No. 1022.

RHODES, JOSEPH, and **KEMP**, RICHARD.—"Improvements " in rag machines."

This invention relates to machines employed in tearing up rags of woollen or other fabrics, and reducing such to fibrous substances technically known as mungo or shoddy, and consists in applying a toothed roller or rollers over or above the feed rollers in contact with the teeth or points of the swift or cylinder for stripping or removing the untorn-up rags therefrom, which rags, by means of other rollers placed in contact therewith, are carried back to the feed apron, which again passes them through the feed rollers to the swift, to be again operated upon.

By means of this invention any rags or fabrics, not sufficiently torn in passing through the feed rollers to the swift the first time, are returned and again passed through, and so on until they are perfectly reduced to fibres.

[Printed, 10d. Drawings.]

A.D. 1861, April 26.—No. 1057.

JOYNSON, Edmund Hamborough.—"Improvements in ma-" chinery for the manufacture of paper."

The invention consists: 1, of an improved apparatus for washing rags preparatory to converting them into pulp; 2, of an improvement in that part of the paper machine at which the pulp is supplied to the wire; 3, to a novel arrangement of apparatus for sizing the paper.

The improved machine for washing rags consists of a long vessel or chest plentifully supplied with water, and in which the dirty rags are supplied by means of a travelling endless belt. This chest is provided with a perforated false bottom, for the purpose of allowing the dirt, grit, and other impurities as they are washed from the rags to pass through. In this chest is mounted a long shaft, called the stirrer shaft, provided with inclined arms or vanes, which, as the shaft rotates, stir up and agitate the rags in the water, and thereby wash them, and at the same time gradually carry them forward to the further end of the chest, from which they are lifted or carried up an inclined channel by means of a travelling endless band or chain provided with a series of forks, teeth, tines, or plates, which will carry up the cleansed solid matters, such as the washed rags, and allow the water and dirt to run away through the perforated false bottoms of the channel. The cleaned rags, as soon as they arrive at the top of the inclined channel, are delivered into any convenient receptacle, and are conveyed away to the pulping engine. The perforated false bottom is curved, to conform to the arc described by the rotating arms of the stirrer shaft. "I " sometimes propose to place the stirrer shaft within a per-" forated rotating cylinder or vessel, which is open at both " ends, and is mounted in an outer vessel plentifully sup-" plied with water. Rotary motion is communicated to the " perforated cylinder in one direction, while the stirrer shaft " is made to revolve in the opposite one, and by making " the perforated cylinder open at both ends, the rags may " be supplied continuously at one end, and will be lifted up " the inclined channel above-mentioned and deposited in any " suitable receptacle."

[*Printed, 1s. Drawings.*]

A.D. 1861, May 3.—No. 1109.

MENNONS, Marc Antoine François.—(*A communication from Edmond Nuewens.*)—"The manufacture of paper and "cardboard from a fibrous vegetable matter not hitherto used "for that purpose."

This invention consists in applying to the paper and cardboard manufacture the agglomerations of vegetable fibres known "as pommes de mer," or marine apples, and which, formed by the breaking and rolling action of the sea on a certain variety of alga ("zostera marina"), are found in large quantities on the coasts of the Mediterranean. These masses of algous fibre are first shredded in an opening or tearing machine ("diâble"), by which they are freed from the sand, pebbles, or other foreign matters, and are afterwards exposed for about two hours to a soda ley, composed of about twelve pounds weight of crude carbonate of soda dissolved in twenty-five gallons of water. The temperature of this ley should be carried to about 120° or 130° (centigrade). When thus cleansed, the said masses are steeped for about an hour in a bath composed of water and sulphuric acid, making about 2° of Beaumé's hydrometer, and during this process are stirred two or three times with a wooden spatula sheathed with zinc. On leaving this bath they are washed and drained off, and are finally bleached by exposure for about an hour in a closed chamber to the action of sulphurous acid gas. The raw material thus prepared is reduced to pulp by the ordinary processes, and is applied to the manufacture of paper and cardboard either alone or combined with variable proportions of other pulps, according to the quality of product required.

[Printed, 4*d*. No Drawings.]

A.D. 1861, May 6.—No. 1141.

BROOMAN, Richard Archibald.—(*A communication from Barthélemy Picard.*)—(*Provisional protection only.*)—"The "manufacture of threads, cords, fabrics, felt, and pulp from "the hop plant."

The inventor states that he has discovered that the stem (hitherto burnt) as well as the root, of the hop plant, contain a ligneous filament, which he has converted into threads and cords, and woven into fabrics. He has also converted the fibres into pulp, and made therefrom excellent paper. The present invention then consists in converting the stem and the root of the hop plant into threads, cords, fabrics, felt, and pulp, and this by any of the means followed for obtaining fibres from similar vegetable substances.

[Printed, 4*d*. No Drawings.]

A.D. 1861, May 11.—No. 1204.

TOOTH, William Henry.—"Improvements in machinery or "apparatus for reducing vegetable substances to a finely "divided state, part of which improvements may also be "employed for sifting or separating the fine from the coarse "particles of other substances."

Instead of the ordinary spiked roller in pulping engines, "I employ a roller, formed as in the preparing machine of "any convenient number of serrated discs, like circular saws, "which are secured on a spindle with thin metal washers "between them, so as to keep them a proper distance apart. "An adjustable breast block, also composed of a number of "serrated discs of suitable form to correspond to the circumference of the roller, is mounted on ways or guides in the "pulp vat, and is provided with adjusting screws for the "purpose of regulating with nicety the distance between the "roller and the block. These parts are so arranged respectively that the teeth or serrated edges of the roller are made "to enter between the serrated discs of the adjustable breast "block, so that the coarse fibres from the former machine "will be reduced to a state of pulp in a much shorter time "than is usually required in pulping engines of the ordinary construction. The reduced vegetable fibres are then "passed into a grinding mill, in which, by preference, the "lower stone or grinding surface rotates while the upper one is "stationary. By this arrangement the fibres when ground "will be thrown off by centrifugal force, and the grinding "surfaces will be kept free. The fibres, or pulp and water, "as they are driven off from the grinding surface, will rise "up in the vat and pass or be drawn down through the eye "of the top stone or fixed grinding surface, and a continuous "circulation of the pulp will be kept up until it is brought "to a state fit to be made into paper. The grinding surfaces "*may be made* either of stone or metal, and they must be

" grooved, roughened, or toothed in a suitable manner. " Previous to supplying the pulp to the paper-making machine, " it should be strained for the purpose of separating the knots " and unreduced fibres. This straining apparatus consists of " any conveniently shaped vessel provided with layers of fine " cloth or gauze, or perforated metal plates of gradually increasing fineness. The part of this vessel which is beneath " the wire cloth communicates by means of a pipe provided " with a cock with a close vessel from which the air is exhausted by means of a pump or other suitable exhausting " apparatus."

[Printed, 2*s.* 10*d.* Drawings.]

A.D. 1861, May 13.—No. 1213.

DEAKIN, JAMES. — (*Provisional protection only.*) — "Improvements in, and applicable to, the manufacture of slabs, " panels, and other forms or articles in paper or paper " pulp."

"My invention consists in embedding in or embodying with " paper or paper pulp, of the description used in the papier " mâché manufacture, a layer or sheet, or layers or sheets of " wire lattice, or hempen or other netting, perforated metal " sheets, or strips of metal, or lengths of wire, by which I " am enabled to form slabs, panels, or other forms of great " strength and lightness, which, when metal is employed, will " also be proof against any attempts to break or cut them " through. By this invention I can also make trays and other " forms or articles in papier mâché, or paper pulp, which will " equal in strength the more expensive descriptions made in " pasted paper, and such articles may also be finished off with " a coating of pasted paper to give them the requisite finish " and surface, if desired."

[Printed, 4*d.* No Drawings.]

A.D. 1861, May 13.—No. 1216.

VAUTIER, ANTOINE CONSTANT.—"Improvements in obtaining " fibrous materials and paper pulp from various trees, shrubs, " and plants."

The invention consists: 1. In producing a silk from the *mulberry tree* without the intervention of the silkworm. 2. In producing fibrous materials of silky and other characters from various other trees, shrubs, and plants. 3. In obtaining paper pulp for these purposes. The vegetable substances in question are treated when in a green or fresh condition. If the tree be cut down when the sap is not rising, and if the bark be dry and adhesive, the trunk or branches should be subjected to maceration, sprinkling, or incipient fermentation. The vegetable substances are beaten, rubbed, bruised, and subjected to maceration, or treatment in hot water, and to rinsings or washings. The products are then dried. If not white enough, they may be bleached before drying by exposure to air or sun, frequently sprinkling them, and again treating with heat and crushing. Although the process should be continuous, it may be interrupted at any stage and the products dried, to be damped and softened afresh when the treatment is to be resumed. The products may be combed, carded, &c., or converted into, or applied as paper pulp.

"Amongst the numerous trees, shrubs, and plants to which " my invention is believed to be applicable, beside the mul" berry tree, I may mention elm, peach, almond, cherry, " plum, and other trees of the amygdalineæ group, medlar, " quince, and others of the pomaceæ group, accacia, robinia, " and various of the mimoseæ group; oak, virgina poplar, " flax, hemp, and textile plants, diss, palmietta, and many " others."

[Printed, 6*d*. No Drawings.]

A.D. 1861, May 13.—No. 1217.

CLARK, WILLIAM.—(*A communication from Louis Joseph Frédéric Margueritte and Alfred Lalouël de Sourdeval.*)— " The treatment of ammoniacal waters resulting from putrified " urines and from products extracted by the distillation of " coal."

This invention consists, in reference to this subject, as follows:—"Directly after the clarification" of "refuse waters" by sulphuret of barium "prepared by calcining in a rever" beratory furnace a mixture of sulphate of baryta and " charcoal," the liquid is heated, "when there results a pre" cipitate mixed with phosphate, carbonate, sulphate, &c. of " baryta, a white precipitate, which can be beneficially em" *ployed for painting*, the thickening of paper, and the prepa-

" ration of cyanides of barium by ammonia or by azote of the " air." The Specification is voluminous, and includes the preparation of ammonia and ammoniacal salts, the preparation of insoluble carbonates, the preparation of sulphur, and apparatus for distilling ammonia, &c.

[Printed, 10*d*. Drawing.]

A.D. 1861, May 18.—No. 1276.

WARD, Frederick Oldfield.—" Improvements in manufac-" turing manure and in obtaining accessory products."

This invention relates to the treatment of mixed fibrous materials, partly of animal partly of vegetable origin; as, for example, mixed wool and cotton rags for their conversion into manure, and accessory products available as materials for paper. A mixed method of separation is employed partly in the wet way " instead of the simple methods of preparation, " some wholly in the wet way, others wholly in the dry way " heretofore proposed for separating the animal from the " vegetable portion of such materials. Further, an earthy " base, preferably lime, may be employed with the aid of " heat and water, and with or without the aid of high pressure, " digestion, or steaming to disintegrate the animal matter, " part of which may thus be dissolved and separated from the " vegetable matter by pressure or otherwise in the wet way, " while the remainder may be separated by beating or other " mechanical means in the dry way. Intimate contact between " the earthy base and the mixed materials may be ensured by " agitating the material in the liquor, or by circulating the " liquor through the materials. Means may also be adopted " to utilize, either in its dilute state or concentrated, or dried " and solidified as a portable manure alone or in admixture " with other fertilizing ingredients, that portion of the animal " material which is separated in the wet way.

" Lastly, the other portion, or that separated in the dry " way, may be subjected with this view to the action of an " improved beating machine, adapted to subject each part of " the material to a succession of light blows so as to crush " and pulverize the friable animal matter without injuring the " vegetable fibre."

[Printed, 6d. No Drawings.]

A.D. 1861, May 28.—No. 1309.

DART, Joseph Henry. — (*Provisional protection only.*) — "Improvements in the manufacture of paper."

The object of this invention is to produce paper pulp from the leaves which cover the ears of Indian corn, which may be obtained in unlimited quantities. The said material is to be pulped and bleached by the ordinary known processes, and used either by itself or mixed with other pulped substances at present in use, and in such proportions as may be desired for the production of various qualities of paper.

[Printed, 4*d*. No Drawings.]

A.D. 1861, May 31.—No. 1364.

HARTNALL, Ebenezer.—(*Provisional protection only.*)— "An improvement in the manufacture of paper."

This invention consists in the application of sea grass (zostera marina) called "grass wrack and oar weed," and when used by upholsterers, called "alva." This material is thrown up in large quantities on the shores of Great Britain and Ireland, as well as elsewhere. In using this material in the manufacture of paper, it is preferred first to bleach the same, but the bleaching may be performed after it has been more or less reduced in an ordinary or other paper engine. The material above-mentioned is reduced into pulp and made into paper in the same manner as other vegetable fibrous materials are which have heretofore been employed in the manufacture of paper; it may be used alone or in combination with other fibrous matters.

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 4.—No. 1410.

BUFF, Heinrich Ludwig.—(*Provisional protection only.*)— "Improvements in the treatment of fatty and oily matters."

These improvements are, in reference to this subject, "the " fatty and oily matters are first treated with nitric acid, either " dilute or concentrated, and either with or without the appli- " cation of heat," adding substances decomposable by "nitric " acid, such as starch, flour, or sawdust." The oily and fatty matters washed are "treated with reducing agents, such as " *sulphurous* acid or compounds of sulphur, which properly

" treated will give off sulphuretted hydrogen, iron, zinc, or " other metals, producing hydrogen with dilute sulphuric " acid or hydrochloric acid in order to remove any oxide of " nitrogen and destroy any other compounds formed by the " previous treatment," when they are washed to remove all acid, and "distilled by superheated steam, or in any other " convenient manner." "The products of distillation are " treated as is well known so as to obtain solid fatty acids. " The residue in the still is a black elastic compound," resembling caoutchouc, which it is stated "is soluble in fatty " oils and hy drocarbons," and among other things is "applic" able to the manufacture of paper."

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 7.—No. 1448.

CROLL, ALEXANDER ANGUS.—"Improvements in the manu" facture of sulphate of alumina."

By the method generally adopted in the manufacture of sulphate of alumina from shale and other aluminous matters, the material to be operated upon is, together with sulphuric acid (oil of vitriol) in a comparatively weak solution, placed in a suitable vessel, and then heat is applied to them and maintained until the desired solution of sulphate of alumina is attained; by this process considerable time is occupied.

"By my improvements, supposing the object to be the pro" duction of sulphate of alumina matter in the form of cake to " be used in the manufacture of paper or otherwise, the shale " or other aluminous matter, as china clay, to be operated " upon, having been roasted, as is well understood, is placed, " after being finely powdered, in a suitable vessel, by pre" ference in a dry state, and also by preference is subjected to " heat till it has attained a temperature of about 300 degrees " Fahrenheit, and I then cause to flow upon it, whilst thus " heated, the sulphuric acid (oil of vitriol) of about 1·700 " strength, and which has also been previously heated to a " temperature of about 300 degrees Fahrenheit, and in the " proportions of about 20 parts by weight of sulphuric acid " to about 20 parts by weight of aluminous matter. The pro" portional quantity of acid required depending upon the " *amount of* alumina, apart from foreign matter, in the

" aluminous matter employed, and which is readily ascer-
" tained by the usual tests. These matters must be intimately
" mixed. By those means a solution of sulphate of alumina
" will be very quickly obtained. I find it better to retain the
" heat in a mass until the temperature is reduced to about
" 150 degrees Fahrenheit; for which reason I have found the
" operation is best conducted upon masses of not less than five
" tons, which may then be cut into the desired forms and
" sizes of cakes."

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 12.—No. 1507.

WATT, JOHN.—" An improved mode of converting vegetable " fibrous substances into pulp."

This invention relates to a peculiar mode or process of converting vegetable fibrous substances into pulp, and consists in subjecting the vegetable fibrous substance to the action of proto-carbonate of soda, or bi-carbonate of soda, or proto-carbonate of potash, or bi-carbonate of potash, or soda ash in solution in water, and heating the whole to the boiling point, and boiling the same until the fibrous substance has been so acted upon that on being washed and treated with an aqueous solution of chloride of lime or chloride of soda, it is converted into pulp.

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 17.—No. 1543.

GRAY, THOMAS. — " An improved method of bleaching " coloured rags and vegetable fibres."

The invention consists in immersing coloured rags and vegetable fibres in a solution of muriatic acid and water and retaining therein a portion of such solution before steeping the same in bleaching liquor, and thereby preserving the fibres uninjured. The rags are then submitted to the ordinary process of bleaching in chlorine liquor. By this double process the colour in the rags is completely discharged and the rags become perfectly white. The above double process is also applicable for bleaching straw, grass, and other vegetable fibres.

[Printed, 4d. No Drawings.]

A.D. 1861, June 17.—No. 1548.

ROUTLEDGE, THOMAS.—"Improvements in the manufac-
" ture of paper."

The invention consists "in the preparation of 'half stuff'" (paper pulp) and paper from esparto or Spanish grass (comprising *spartum-ligeum, stipa tenacissima, dis or lilfa*), the same being applicable to straw and other raw fibrous substances. The general details of the process are the same as specified in No. 274, of 1860, the improvement consisting in that portion which relates to the preparation of the leys employed in boiling the esparto or other raw fibres, and in order to preclude the presence of lime in the caustic state, or even too much causticity in the leys, either of which would produce a very injurious effect, "take from 9 to 11 per cent. of soda,"
" and having determined the amount of carbonic acid it con-
" tains in combination, reserve from 5 to 25 per cent. of it in
" the state of carbonate, dissolving the remainder in water not,
" less than 9 to 10 times its weight, using a jet of steam to
" facilitate the operation." "I then add a sufficient quantity
" of lime in the caustic state, or in the state of hydrate, to
" absorb the carbonic acid combined with the soda, blowing
" up with steam," "to effect the necessary chemical decom-
" position, which done, and the ley allowed to settle perfectly
" clear, I run it into the boiling pan over or through a sieve or
" perforated vessel containing the soda, above referred to
" reserved in the carbonated state;" "care must be observed
" to insure the ley being sufficiently carbonated, and also
" sufficiently caustic, as without the latter the silica would not
" be rendered soluble. I find from 5 to 25 per cent. of the
" quantity of soda salt used should be in the state of carbonate,
" and of this not less than 5 per cent. be put in the pan in
" which the fibre is boiled, which, in the event of any lime in
" the caustic state being accidentally run in with the ley, will
" ensure its being converted into carbonate. Hydrate, or
" caustic, or other salt of soda or potash, if not too costly, may
" be employed in making the leys, but in either case 5 to 25
" per cent. should be in the state of carbonate, or reduced to
" that condition."

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 22.—No. 1604.

LE HARIVEL, Auguste Lucien.—"Improvements in the "manufacture of paper, papier mâché, cardboard, and other "similar articles."

The invention consists in making these articles of wood, by means of machinery, which first converts the wood into fibre and pulp, and then separates and sorts the fibres according to their fineness. The wood having been reduced to lengthy fibres by means of circular saws, is afterwards led into the eye of the upper stone of a common meal mill, and then ground into pulp. It is then sifted in sieves of different sizes. The finer pulp goes to make fine paper, the coaser has to be reground or employed in the manufacture of common paper, cardboard, papier mâché, and other similar articles.

[Printed, 10*d*. Drawings.]

A.D. 1861, July 15.—No. 1783.

DE LA PROVOTAIS, Emile Georges Fermier.—"Extracting the fibres from genista scoparia (broom), and their application to manufacturing paper and fabrics, and also treating "the washing waters so as to obtain dyeing products therefrom."

The invention consists in the treatment of all kinds of broom (genista scoparia) for the purpose of obtaining: 1st, ligneous fibres suitable for the manufacture of paper, pasteboard, or fibres intended to be converted into fabrics; 2nd, in obtaining colouring matters from the washing waters remaining after the treatment of the fibres.

The treatment of broom for the purpose of preparing the fibres consists of several operations, viz., the collecting of the broom; its hasty retting in water heated by steam; its barking or decortication by being passed between hard stone cylinders; the separation of the fibrous from the ligneous part; and the treatment of the ligneous part for its conversion into threads similar to hemp or flax threads.

The following is the method of preparing the pulp:—1, collecting the broom; 2, its water retting; 3, its barking or decortication; 4, its washing in running water; 5, its boiling in water heated by steam; 6, its treatment by alkali or alkaline carbonates; 7, its washing in water; 8, its treatment by chlorine or hypochlorites. After which operations the pulp is ready for use in the manufacture of paper.

[Printed, 4*d*. No Drawings.]

A.D. 1861, July 19.—No. 1822.

HENRY, MICHAEL.—(*A communication from Marie Anne Pelagie Veronique Causique, formerly Le Roux.*)—"Im-
" provements in the production of paper pulp and certain
" fabrics, also an apparatus for cutting wood applicable for
" carrying out part of the invention."

According to this invention paper pulp is manufactured of resinous or other wood, divided, torn, crushed, or brought into a state of splinter, splint, shaving, thread, ravelling, chip, fillet, fragment, powder, and then brought into a state of pulp by boiling and subjecting it to the action of alkaline solutions. The invention also relates to modes of bleaching by means of a bath containing about ten per cent. of sulphuric or hydrochloric acid, washing well, and adding liquid or gaseous chlorine.

[Printed, 8*d*. Drawings.]

A.D. 1861, July 23.—No. 1844.

GRAY, THOMAS.—"An improved method of preparing flax
" from old materials for spinning and other purposes."

"I take old tarpaulin or sailcloth, or canvass and old floor-
" cloth, or oil or painted cloth, and boil the same in a strong
" solution of soda ash or other alkali for about the space of
" three hours, whereby the mineral and resinous matters con-
" tained therein are decomposed. I then cleanse the same by
" washing and rinsing in hot or cold water to clear the flax
" fibre from all impurities ; I then dry the woven fabric, which
" is then to be run through a machine called a breaker, in such
" manner that the woof or weft shall be torn or separated from
" the warp. The material is then to be passed through a
" tucker or tenter-hook revolving machine for the purpose of
" opening the threads and preparing the material for the next
" process, which is to pass it through a carding machine as
" often as may be required, according to the purpose to which
" the flax fibre is to be applied. The material may be bleached
" *after undergoing* the first, or any subsequently described

" process, if intended to be used in an uncoloured state. The " fibre is then in a fit condition for spinning" or other purposes. "The waste flax, which is not fit for spinning or " making wadding, can be converted into pulp for paper-" making."

[Printed, 4*d.* No Drawings.]

A.D. 1861, July 29.—No. 1894.

JOYNSON, Edmund Hamborough.—"Improved machinery " or apparatus for disintegrating, crushing, or drawing out " vegetable fibre."

The invention has for its object the disintegration of the fibres of vegetable substances so as to bring them into a state to be used for conversion into pulp for the manufacture of paper, and consists of a travelling endless table composed of metal plates joined together in the form of an endless chain which presses round two octagonal or prism rollers to which motion is communicated from the prime mover. A stationary table, on which the vegetable fibre to be operated upon is placed by the attendant, is situated at one end of the machine, and another table, inclined board, or suitable receptacle to receive the disintegrated fibres after they have passed through the machine, is situated at the other end.

[Printed, 1*s.* Drawings.]

A.D. 1861, July 30.—No. 1896.

SAUNDERSON, Thomas.—(*Provisional protection only.*)— " A pasteboard, millboard, and cardboard medal for advertising " purposes in lieu of handbills."

"An imitation of medals in pasteboard, millboard, card-" board, and papier mâché, the sizes of the coinage of Great " Britain and Ireland, or any other country, and printed in " gold, silver, and copper bronzes, or gold, silver, and Dutch " metals, or any colour or pigment, with and without any " device, inscription, medallion, or design printed, embossed, " engine-turned, or stamped thereon, for any advertising " trade or secular purposes, or in any other circular or oval " shape, or any other size in imitation of a medal."

[Printed, 4*d.* No Drawings.]

A.D. 1861, August 19.—No. 2058.

SMITH, William Henry.—"Improvements in the prepara-"tion, application, and manufacture of peat."

The second part of the invention consists in the application of vulcanized peat to ornamental articles as a substitute for papier mâché. The vulcanized peat is for this purpose "heated in combination with soda, gum, or oil, or water of "linseed, and moulded into suitable shape."

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 22.—No. 2096.

JOHNSON, John Henry.—(*A communication from Jeanne Françoise Marie de Cassan, and Jean Baptiste Meyer.*)—"Improvements in the preparation of pulp for paper."

This invention consists in making subservient for this purpose, and suitably treating, hay damaged by rain or damp, the residuum or pulp of beetroot from sugar manufactories, and sea wrack grass, either of which substances are first immersed for about two to twenty-four hours, more or less in a lime bath. After this the substances are left to soak in an alkaline ley or liquid composed of lime, soda, potash, or ammonia, common sea salt, and nitric or hydrochloric acid and water; lime 20 per cent., soda salt 5 per cent., nitric acid 150 to 230 grains troy for every 200 lbs. of the substance, sea salt 8 per cent. The ley once well made will act during eight to twelve hours, the thus lixiviated substances are boiled, either in an open or closed boiler, under a pressure of about three to four atmospheres for about twelve hours. The substances are then washed, either with phenic, trinitro-phenic or carbazotic acid, and finally well washed in water, after which they may be bleached by any of the known bleaching processes, by preference by means of chlorine or sulphurous acid.

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 22.—No. 2103.

RICHARDSON, Thomas, and IRVINE, Robert.—"Improve-"ments in the manufacture of paper."

The invention consists in applying in the manufacture of *paper* aluminous cakes, obtained by acting on pit or alum shale or blaes, either in a natural or roasted state, or on those ashes of bituminous minerals which consist chiefly of silicate of alumina, with sulphuric acid, in substitution of the alum or aluminous cake heretofore employed, and which is extracted and manufactured from the compound of shale, blaes or ashes, and acid above mentioned at considerable cost.

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 28.—No. 2110.

BROOMAN, Richard Archibald.—(*A communication from Barthélemy Picard.*)—(*Provisional protection only.*)—"An "improved method of treating the hop plant to obtain a "material resembling wool."

The plants are dried, put in trusses, and laid in sheds or barns, which must be dry and well ventilated. The plants are then sorted for the branches, and different parts produce different qualities of wool, and are passed through a crushing machine to break them up and to crush the knots which are somewhat harder than the stalks, and contain a resinous gum more tenacious than that in the intermediate parts. The crushed plants are next submitted to the action of stamps or hammers which beat out the resinous or gummy matter.

The vegetable wool with the waste still adhering to it is submitted to the action of beaters, which free it from all foreign matters, and prepare it to be combed and carded previously to being spun or otherwise used in the arts and manufactures, or it may be used without being combed or carded.

Among other uses it forms a valuable material for the manufacture of pulp for paper and other purposes.

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 30.—No. 2159.

JAILLE, Alexandre. — "An improved manufacture of "manure."

The invention consists in placing waste animal matter in a digester-boiler, and entirely dissolving it by the introduction of steam at a pressure of from two to three atmospheres. The mass is then placed in a malaxing or kneading trough, and a quantity of bone dust added to it. It is then dried and ground.

"The means which I employ to liquefy wool, horn, bristles, "hoofs, hair, whalebone, feathers, leather, tendons, and all "other animal matters hitherto deemed insoluble really constitute the principle and fundamental object of my invention," and "the manufacture of any description of manure is "but one of the applications which this process enables me to "realize, and I desire it to be understood, that I claim the "exclusive use of my invention for every application of which "it is capable. Thus, when woollen rags, always mixed with "divers textile matters, such as cotton, hemp, flax, or other, "are operated upon the animal matter only is dissolved, and "every vegetable matter still remains within the apparatus, "and may very well be used in the preparation of pulp for "paper-making."

[Printed, 4*d*. No Drawings.]

A.D. 1861, September 12.—No. 2268.

MENNONS, Marc Antonie François.—(*A communication from Louis Achille Carteron.*)—"An improved combination "of chemical and mechanical processes for the conversion of "fibrous vegetable matters into paper pulp."

Among these vegetable products are straw, wood, ferns, aloes, sparticime, nettles, dwarf palm and banana. The operation, in the case of straw, is to reduce the straw in its rough uncleaned state to lengths of from eight to twelve inches by means of ordinary cutting machinery. To produce two hundred weight of pulp, about double the quantity of cut straw is carried by an elevator and truck to the cast-iron vats, and a boiling caustic ley is poured over the mass, which is composed of—water, 212 lbs.; slacked lime, 72 lbs.; crude caustic soda, about 36 lbs. After a five hours' maceration in this ley, the straw is washed by a current of water, on the completion of which operation it is exposed for two hours to the action of an acid bath, composed of water and sulphuric or hydrochloric acid, gauging 1° (Beaumé). At the expiration of these two hours the acid solution is drawn off by stop-cocks set in the bottom of the vats, which are then turned over on their trunnions, and emptied into a truck. By this truck the raw material is carried to certain repose stages, where it is left for twenty-four hours, after which it is passed to the bleaching vats, charged with a solution of chloride of lime, gauging 3°

(Beaumé), and is there reduced to pulp in about forty minutes. From the bleaching vats the pulp falls into agitators, from thence into purifiers, in which it is freed from knots and other extraneous matters; from the purifiers it passes to drainers, and finally to "hydro-extractors," on leaving which it is ready for conversion into paper. The *modus operandi* is precisely the same for the other substances mentioned.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1861, September 18.—No. 2328.

PARTINGTON, Edward.—"Improvements in machinery or "apparatus employed in the manufacture of paper."

The invention relates to that portion of the manufacture when the material is in the state called half stuff, and is designed for the purpose of separating the superfluous liquid from the material, to prepare it for the machine called the "willow and washing" machine.

The improvement consists in the employment of one or more pairs of bowls or rollers suitably supported in a framing, between which rollers the material in the half stuff passes, and is pressed until sufficiently solidified for the next operation. The material is fed to the rollers by means of an endless travelling cloth, and is received, after having been pressed by the rollers, by another endless cloth. The upper roller is formed or composed of large discs placed side by side and loose upon the central shaft, in order to allow any portion of the roller to rise in the event of any solid matter passing between the rollers.

[Printed, 10*d*. Drawings.]

A.D. 1861, September 19.—No. 2348.

REDWOOD, Theophilus.—(*Provisional protection only.*)—"An improvement in the manufacture of paper."

The invention consists in the use of sulphite of zinc, which is added to the pulp, for the purpose of preventing the injurious effects of chlorine or compounds of chlorine, which may result from the process of bleaching the rags, and also for improving in other ways the quality of paper. "I have "found the addition of about five parts of the sulphite to as "much of the pulp as contains one hundred parts of the dry

" ingredients, to answer the purpose, but I do not confine " myself to this proportion."

[Printed, 4*d*. No Drawings.]

A.D. 1861, September 20.—No. 2351.

OLIVER, John, GRANTHAM, John, SINNOCK, William, and LEVERSON, Montague Richard.—" Improvements in " the mode of obtaining certain chemical substances, and in " the treatment of vegetable fibre, and in obtaining manurial " and other products therefrom."

The invention consists in macerating the fibrous material in water, or a solution of mixed alkaline salts, after which it is subjected to mechanical abrasion, by which a considerable quantity of organic matter and inorganic constituents are removed in combination with the alkaline salts used in the operation. It is next treated with nitric acid or nitrous acid and various oxides of nitrogen and atmospheric air, by which the neutral and alkaline compounds are partly decomposed. After this the vegetable fibrous material is transferred to a bath of diluted nitric, nitro-hydrochloric, hydrochloric, or sulphuric acid to remove any metallic, earthy, or phosphatic compounds, and afterwards bleached. The bleaching agents comprise certain combinations of sulphur and oxygen, oxygen and hydrogen, chlorine, free and in solution. The bleached fibrous material is then washed, treated with sesqui-carbonate of soda immersed in a diluted solution of mineral acid, and finally washed in water, to remove all trace of saline matter. The superfluous water is then removed from the pulp by pressure.

[Printed, 6*d*. No Drawings.]

A.D. 1861, October 4.—No. 2480.

KNOX, George.—" An improvement in paper-making machines."

The invention consists in making a circular knotter-plate of brass or other metal, or putting together a number of segmental plates, so as to form a circular knotter-plate, " the cuts " or slits being of the dimension and size commonly in use." The knotter-plate is fixed in a bed or framework of convenient depth to admit of a continuous flow of pulp from the pulp chest, being distributed over the part of the surface exposed thereto, and underneath is placed a trough to receive the pulp and pass it on to the machine.

The knotter is made to rotate horizontally, and has communicated to it by appliances to the axis or shaft through the centre, "the jumping motion" which is now generally given to knotters for the purpose of shaking the fibre through the knotter-plate, and thereby supplying the wire of the machine. This trough for the supply of the machine, placed at the end thereof, and contiguous thereto, is the shape and size of one-half of the circle by a line drawn through the centre, although it may be of other proportions; another trough, forming a like semicircle, is placed underneath the other portion of the knotter-plate, the contents of this trough being conveyed by means of a pump to the beating engines. The upper surface of the knotter-plate is also divided into two parts, one of which includes the entire semicircle or other proportion of the knotter-plate placed above the trough for the supply of the machine, and one-fourth, or other proportion, of the other semicircle (making $\frac{5}{8}$ths of the entire circle). This division is effected by means of a belt or cushion of vulcanized india-rubber or other suitable material of the depth of the knotter-bed fastened to a frame, so that the india-rubber, by means of a spring applied to the frame, presses firmly against the knotter-plate, and is kept in a slightly inclined position towards the same, and which frame has communicated to it the same jumping motion as the knotter. To the $\frac{3}{8}$ths, or other proportion of the knotter-plate, which is thus kept free from pulp, a constant stream or shower of water is applied with such a degree of force as will entirely cleanse the cuts of the knotter-plate as they come under its operation by the circular motion of the knotter, and the part thus cleaned passes under the india-rubber belt, and is brought again as clean as a new knotter-plate to receive fresh pulp. On the small section of the knotter-plate, viz., $\frac{1}{8}$th, or other portion, which receives the pulp on the upper surface, but is always moving over the water trough, and never over the machine trough, the knots will accumulate as the plate moves round, but they are kept back by the india-rubber belt, and, as often as may be necessary, are removed with an india-rubber scoop, or other contrivance, care being taken not to approach too near the part over the machine trough, so as to injure the quality or disturb the weight of the paper.

[Printed, 10d. Drawing.]

A.D. 1861, October 12.—No. 2550.

PIRSON, Victor, and DE KEYSER, Augustus.—(*Provisional protection only.*)—" The application of a new material " in the manufacture of paper, cardboard, and yarns."

"In the manufacture of paper, cardboard, and similar " articles, we use the lucern root, or Spanish trefoil, and treat " it in the same manner as linen and cotton rags are operated " upon in the manufacture of paper, that is to say, after being " picked and prepared, it is subjected to the lye washing, then " opened, put out to bleach, and afterwards placed in the " refining mortar. The paste thus obtained is used in the " same way as the ordinary pulp is now used in the manufacture of paper, either alone, or mixed with other substances, " such as rags and similar articles. In the manufacture of " yarn or thread, the lucern root is subjected to the same preparatory operations as hemp or flax are now used."

[Printed, 4*d*. No Drawings.]

A.D. 1861, October 14.—No. 2562.

HOUGHTON, Frederick Burnett.—" Improvements in " apparatus employed in reducing straw and other vegetable " substances in the manufacture of pulp for making paper."

The invention relates to obtaining paper pulp from straw and other vegetable substances. The boiler employed is cylindrical, with hemispherical ends; within it is a shaft or axis passing through a stuffing box at one or both ends. On this shaft are fixed several bent or curved blades, the edges of which are bent up, so as to form scoops; these blades are fixed at intervals all round the shaft, and they are of a length to come within a few inches of the inner surface of the boiler. To this shaft rotary motion is communicated, by which the materials under operation are continuously moved and raised out of the alkaline solution in the lower part of the boiler, which is about one-third filled with that fluid. The boiler is heated from the interior by water circulated in closed pipes or tubes on Perkins' principle. At the upper part of the boiler is a man-hole, through which the straw or other vegetable materials are introduced, and there is also a blow off steam pipe and a safety valve at the top of the boiler to cool it and to wash the vegetable matters before *withdrawing* them from the boiler. When the boiler and the materials therein are to be cooled, water is pumped into the boiler, for which purpose one or more pipes connected with suitable forcing machinery are used.

[Printed, 10*d*. Drawings.]

A.D. 1861, October 21.—No. 2628.

FENTON, FERRAR.—"Improvements in obtaining and treat-"ing fibrous substances."

The invention consists in treating the class of plants known as endogens, and the leafstalks, leaves and bark of all the exogens by means of dilute solutions of acids, alkalis, and ammonia. By this method also, the common flax plant will yield a much larger proportion of fibre than by the old plan of rolling, and the New Zealand flax can be reduced to fibres in a few hours at a very trifling cost. The ammoniacal preparation is only applied to those substances which do not yield to the acids.

The ripe stalks are steeped in a weak solution of muriatic acid, and when the mucilage is sufficiently acted upon so that the stalks or leaves feel soft when pressed, they are removed from the acid bath and plunged into one of common soda, where they remain until chemical effervescence ceases, when they are beaten and heckled like flax from the linseed plant, except in the iris tribe, where scraping must first be used whilst they are wet, and combing afterwards. "The refuse "from the preparation of fibre from the above unlimited "sources, and by the above processes is a pulp which might "be advantageously used in the manufacture of paper."

[Printed, 4*d*. No Drawings.]

A.D. 1861, October 30.—No. 2725.

COOK, WILLIAM, and COOK, HENRY.—"Improvements in "printing telegraphs."

The invention relates to that description of instrument in which the visible signals that are made on the paper are effected by the transmission of an electric current to the paper after the latter has been prepared with chemical agents which are liable to decomposition by the agency of electricity, and consists in preparing the paper with a salt of manganese, which for various reasons will be found more advantageous and useful than the chemical agents usually employed for analogous purposes.

"In carrying out our invention, we find it convenient and
" advantageous, before submitting the paper to the chemical
" solution or salt of manganese, to prepare it with an alkali,
" so that any free acid contained in the paper or in the solution
" of manganese may be neutralized and prevented from acting
" injuriously during the action of the current of electricity on
" the manganese salt. The alkali will also prevent the decom-
" posed salt from being re-dissolved in the solution. Various
" salts of manganese may be employed for effecting the pur-
" pose which is the object of our invention, as many different
" salts of manganese are decomposable by the agency of elec-
" tricity; but we have found that practically the nitrate of
" manganese is preferable to any other salt, and in fact is
" comparatively the only one that can be used with facility
" and advantage. The solution of the nitrate of manganese
" which we employ should be of about the specific gravity of
" 1·320, and before preparing the paper with the solution of
" nitrate of manganese, it should be steeped in an alkaline
" solution, say, mono-carbonate of soda or potash, the solution
" well drained off, and afterwards soaked in the solution
" of nitrate of manganese, when the paper will be ready for use."

[Printed, 4*d*. No Drawings.]

A.D. 1861, November 4.—No. 2767.

STEWART, JOHN.—(*A communication from Louis Joseph Fillion.*)—(*Provisional protection only.*)—"Improvements in
" the manufacture of cards for jacquard weaving."

The invention relates to a system or mode of renewing the cards used in jacquard weaving mechanism, so as to avoid waste of material. Two cards, representing different colours, are taken, and the layers of paper which form the card are separated at the corner to a small extent by means of a knife. The layers of paper are then completely separated, and the layer or half of one card is glued or otherwise cemented to the half of the other card. The two remaining halves of the cards are in like manner glued or cemented together, so that the four parts again form two perfect cards as the perforation in each half are covered by the solid parts of the other half, and *the parts,* when joined in this manner, are again ready for being punched. As the moistening of the cardboard has the effect of altering its length to some extent, the barrel or guide holes at one end are made to correspond, and at the other they are filled up by interposing a piece of paper between the layers of the card, and the barrel hole is afterwards punched out. The cards thus prepared are subsequently submitted to pressure in any convenient manner, so as to cause the layers of cardboard to blend or adhere firmly together.

Another mode of making these renewed cards, where a greater degree of stiffness is required, is to combine three layers of paper by cementing one layer of new card paper to the surface of two old or used cards, and so forming two new cards, the new ones being re-punched in the ordinary manner.

Another mode or process consists in cementing one layer of new card paper on to each half of the old or used cards, separated as before described, so as to make the renewed cards of the original weight.

Under another modification, which avoids the necessity of unlacing the cards, the old or used cards have cemented to their faces two strips of card paper, each piece extending from the end or guide holes to the central holes, where the cards are united or laced together. The two pieces of card thus glued to the surface of the cards then cover the old holes, so as to admit of their being again punched to form a new set of cards. This mode of proceeding avoids the necessity of separating the series of cards, and thus effects a considerable saving of time as well as of material.

[Printed, 4*d.* No Drawings.]

A.D. 1861, November 13.—No. 2846.

HOLT, THOMAS LITTLETON.—(*Provisional protection only.*)—
" A new method of making paper from the cochlearia ar-
" moracia, or horseradish."

"I take the stem of the leaf of the horseradish, and using " the same means as are used with hemp or flax stems, render " it into fibre by boiling or steeping. I then take the fibre " and reduce it by the ordinary means used in the manufac- " ture of paper for the reduction of fibres, whether raw or of " rags, into pulp, which can then be manufactured into " paper by the ordinary processes and machines in common " use."

[Printed, 4d. No Drawings.]

A.D. 1861, November 19.—No. 2903.

REDWOOD, Theophilus.—"Improvements in the manu-" facture of starch, and of vegetable sizing powder."

The invention consists in adding oxide of zinc to the solution of the caustic soda or other alkaline solution in which the rice is macerated. The effect of this addition is to prevent fermentation, the formation of mould or fungus, and the generation of acid during the process, and at the same time to cause the alkaline solution to act more speedily and effectually upon the hard glutinous portion of the grain, so as to set free the starch. The alkaline solution used is that of Orlando Jones's Patent (30th April 1840). To every one hundred gallons of such solution is added about 1 lb. of oxide of zinc, which is dissolved in the solution, and in other respects the process for the separation of the starch is conducted "in the same or a " similar way to that in which it is now usually conducted by " rice-starch makers, excepting that I sometimes use sul" phurous acid and an additional quantity of oxide of zinc in " the latter part of the process, so as to obtain sulphate of " zinc mixed with the starch, which mixture is used with " advantage in the manufacture of paper."

2. Vegetable sizing powders, produced by adding to starch an acid solution of chloride of zinc, then drying the starch with this solution which has been added to it; and lastly heating the dried starch in an oven at a temperature of about 240° Fahrenheit. This solution is advantageously used for sizing paper, &c.

[Printed, 4*d*. No Drawings.]

A.D. 1861, November 22.—No. 2935.

DAVENPORT, Thomas William, and COLE, Samuel.—" Improved compositions to be used in making buttons, beads, " miniature and picture frames, and other articles susceptible " of being moulded in a plastic material."

Paper, papier mâché, or dried paper pulp reduced to fine powder, is mixed with some or all of the following ingredients, —Glue, paste, gas tar, black tar, varnish, copal varnishes: pitch, resin, gold size, and a small quantity of oil. "The " powder with glue and paste alone answers for some uses, " for others, such, for instance, as bead-making, it requires

" strengthening; consequently we introduce gas tar or varnish, " and other vegetable fibre, such as paper reduced to pulp, " india-rubber, or gutta percha, in small quantities. These " would be applicable when a dark-coloured composition is " required, but when we want a light colour, we employ copal " varnishes, gold size, or any nearly colourless agent we may " find best. Gold size and whitening forms another excellent " composition for some works. The greater portion of these " materials may be mixed cool, the glue, of course, requiring " heat; they are to be combined into a thoroughly plastic " state. The composition is then to be modelled or moulded " in dies, as the case may be, to any suitable form for the " purpose for which it is destined."

[Printed, 4*d*. No Drawings.]

A.D. 1861. November 23.—No. 2950.

DE WYLDÉ, FÉDOR.—(*A communication from Louis Dupont.*)—" Improvements in paper-making making machinery."

These improvements have reference to the pulping machine " or rag engine," and by them it becomes possible to " reduce " into paper stuff or paste certain ligneous or vegetable " matter, such as the stalks of hops, bark, and the like, it " being perfectly unnecessary to submit the same to any " preliminary process whatever," either by acids, alkali, or spirits. The improvements consist :—1. In certain forms and dispositions given to the metallic plates which are placed under the pounder, beater, or cylindrical rubber. 2. In certain new forms and dispositions given to the blades upon the edge or periphery of the said cylinder. These plates are formed in segments mounted upon a bed plate so as to form a segmental " race," in and upon which the cylinder is placed in contact, adjustable at a greater or less distance as may be required.

The plates above mentioned in the existing machinery have on their superficies, in contact with the blades of the cylinder, channelled projections or flutes with rounded edges, and these projections are formed in longitudinal series, and are placed parallel to the axis of the cylinder, and parallel to the beating or rubbing blades which are placed or formed round the periphery of the said cylinder. This segmental plate " race " and cylinder constitute the mill or stuff engine used for reducing rags and other materials to a fibrous "stuff" or paste.

" Now, in the improved plates and cylinder blades, in lieu " of the projections above mentioned, I have substituted " square (or slightly angular) projections, having their rubbing " surfaces (between which the rags and other materials are " triturated) flat but grooved or chased diagonally in one or " both directions similar to a single or double cut file so as to " rub, or grind, or triturate the rags and other materials more " perfectly, and more effectively to reduce them to the required " consistence of fibrous pulp, stuff, or paste than can be done " by the engine or machinery now in use."

In addition to the improvements in the rubbing surfaces of the plates and cylinder blades, the plate and the blade are formed in such a manner that the blades on the cylinder and the plates on the " race," or " the projections thereon, are in " diagonal positions the one to the other at any required angle, " and not parallel to each other as in the machinery now in " use. This improvement is effected either by placing the " plate in the race diagonally, or the blade on the periphery " of the cylinder straight or *vice versâ*."

[Printed, 4*d*. No Drawings.]

A.D. 1861, November 26.—No. 2973.

BOTTOMLEY, George.—" Improved machinery for cutting " up linen, cotton, woollen, and other rags, fibrous waste, or " vegetable substances for various 'purposes' in the industrial " arts."

This invention is intended to be applied more particularly to cutting up rags preparatory to reducing them to pulp for the manufacture of paper; but the improved machinery may also be employed to cut up woollen rags preparatory to disintegrating them, and reducing them to a fibrous state. One of the essential features of novelty in the invention is the employment of a pair of cylinders of peculiar construction, to which the rags or material to be operated upon are fed by a travelling endless belt or apron on which they are placed by the attendant. One of these rollers is provided longitudinally with a series of blades having angular cutting edges, which, as the roller *rotates, are* brought in succession against the surface of a corresponding series of flat metal bars, which are fixed in the periphery of the other roller. The cutting blades of the first roller are secured in their places by wedge-shaped pieces, which are firmly held by screw bolts, or in any other convenient manner. The two rollers are geared together by toothed wheels on their respective axles, so that they may revolve in unison, in order that the cutting edges of the upper roller or cylinder may always come against the flat bars of the other cylinder. It will therefore be understood that by this arrangement of parts the rags or other substances will be nipped between the cutting edge of one roller and the flat bars of the other, and will thus be cut or divided; and after having passed between the two rollers, the rags or other substances will be delivered on to a pair of conical rollers, which are placed beneath, and are made to rotate in opposite directions, so as to turn the cut rags or other substances over or round, and deposit them on another endless travelling cloth or apron in a longitudinal direction. The rags will be carried forward by this second travelling cloth or apron to a second pair of cutting rollers constructed like the first, and whereby they are still further cut up or divided, and in this state they are ultimately delivered from the machine into any convenient receptacle.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1861, November 27.—No. 2988.

MEARING, Horatio.—"An improved lucifer match, and pre-"pared paper for igniting the same."

"This invention has for its object the production of a match "and prepared paper for igniting the same, whereby the great "damage caused by the frequent ignition of the ordinary "match will be prevented. I take splints made either of "wood, wax, or other substance and dip the ends in melted "sulphur. When dry I again dip them in a composition "made in the following manner:—I take of powdered potash "ten parts; oxide of antimony, four parts; smalts, four parts; "gum, two parts, and reduce them, adding a sufficient quantity "of water to form a paste. After being dipped in the above-"mentioned paste, the match is dried in the ordinary manner.

"For the manufacture of the prepared paper I first make "the following composition:—Take flour of glue and render

" it into a paste; to two parts of this paste I add amorphe-
" phosphorous six parts; graphite, in powder, one part; and
" silicate of soda, one part; these substances must be inti-
" mately mixed together, and the paper is to be coated with
" this preparation by a brush or other means and dried."

[Printed, 4*d*. No Drawings.]

A.D. 1861, December 6.—No. 3058.

BAILEY, John, and BAILEY, William Henry.—"Improve-
" ments in apparatus for indicating the pressure of steam and
" gases, the amount of vacuum, the flow of fluids, the weight
" of materials, and the speed of bodies, either revolving or
" traversing, and also the employment of aluminium or its
" alloys in the manufacture of the same."

This invention consists: 1, in the application to steam, pressure or weigh gauges, of a knife-edged pivot attached to the weight or its equivalent, so as to act as a lever; 2, in the application to spring gauges of a regulating arm or lever connected by a rod or link to the piston, the top of which is in contact with the spring; 3, in the employment of a lever in heat gauges and steam and water traps; 4, in indicating the speed of any revolving or traversing body by means of a pair of ordinary governor balls put in motion by the shaft or body required to be indicated; 5, in the employment for the apparatus herein described of papier mâché "in the manufacture
" of dials and cases, and also of aluminium, or its compounds
" or alloys for diaphragms, screws, or other parts, that metal
" being superior to most others in preventing oxidization."

[Printed, 1*s*. Drawings.]

A.D. 1861, December 16.—No. 3151.

WILLIS, John, junior.—"Improvements in the preparation
" of materials applicable to the manufacture of paper."

The invention consists in the preparation of oatmeal seeds and sawdust, so as to adapt them for use as ingredients in the manufacture of paper, either separately or in combination.

The mode of preparing the oatmeal seed is, for some kinds of paper, to split or divide them in a mill by means of fluted grinding stones, and for other kinds to grind them into a fine *powder*, by bringing the grinding stones closer together, and, if necessary, to sift the powder. And the mode of preparing the sawdust is first to dry it in a kiln, or otherwise, then to sift it, and grind it into a fine powder, and sift it again, if required. In case it should be found necessary, a small quantity of salt may be mixed with the sawdust for the purpose of preventing it from becoming inflamed by the heat caused by the friction of the stones. For finally sifting the ground sawdust it may be found advisable to employ a set of brushes fixed on a travelling endless belt kept to the surface of the sieve by springs on a revolving barrel covered with wire, and fixed brushes may be combined with the sieve.

[Printed, 6*d*. Drawing.]

A.D. 1861, December 19.—No. 3185.

TREUILLE, Alphonse, and **TRAXLER**, François Xavier.—(*A communication from Joseph Prosper Olier.*)—" Improvements in the manufacture of paper and cardpaper, or " cardboard, with the object of preventing forgery and altera- " tions in cheques and other documents, and which improve- " ments are also applicable to the manufacture of playing " cards and railway and other tickets."

This invention relates to a safety paper, which consists of a single sheet formed of several layers of pulp superposed, of different natures and hues according to requirements, and it may be made as resisting and strong as required for the various purposes. As regards bank notes, which are made generally of two descriptions of pulp, the one obtained from hemp or cotton rags, and the other from hemp only; as the latter, which gives a great degree of solidity to the paper, is, by its very nature, averse to receiving a fine impress, the same may be laid between two layers of rag pulp. Should it be desired to make the filigree more distinct, and also to increase the difficulties of forgery, this middle or internal layer may be coloured, and thus a sheet be obtained, the surfaces of which are white, while the middle is coloured. The same process may be employed with the object of preventing forgery in industrial or other shares. In order to prevent the falsification of public or private writs or deeds, it suffices to dye the pulp intended to form the middle layer with a delible colour, as common ink, for *instance*. In the latter case, the chemical agents made use of for rubbing out the writing will infallibly destroy the internal colour; which, from its being of a like nature, cannot be restored again, while the paper surfaces remain white. As regards playing cards, by interposing a layer of coloured pulp between two layers of white pulp, the desired opacity will be obtained; and cards thus made are not liable to divide. By a similar process, and by placing a filigree inside, the collection of the tax due for the manufacture of playing cards can be readily secured; and forgery prevented in railway or other tickets.

[Printed, *4d.* No Drawings.]

1862.

A.D. 1862, January 13.—No. 87.

SOUTHBY, Anthony Gapper. — (*Provisional protection only.*)—"Improvements in the preparation of pulp for paper-"making."

These improvements are, "chiefly in the slow and continuous "percolation of water or other liquids through the paper stuff "when packed into a dense mass." For the purpose of bleaching, bleach liquor is slowly percolated, and "partially "exhausted bleach liquor" may be used "in commencing the "process of bleaching." In washing out of paper stuff, after it has been bleached, "the bleach liquor and the coloring "matters which have been rendered (by the application of the "bleach liquor) soluble in water or in solutions of alkalies or "acids," by means of "the slow and continuous percolation "of water or solutions of alkalies or acids through the paper "stuff when packed in a dense mass," and after bleaching as "above, or any other method of bleaching." The apparatus preferred to be used "for each of the above processes consists "of a vat or series of vats with false or strainer bottoms," so close as to prevent the fluid "carrying any of the fibre of the "*paper stuff* with it."

[*Printed, 4d.* No Drawings.]

A.D. 1862, January 20.—No. 144.

BOALER, William.—(*A communication from John Adams Rhodes.*)—"Improvements in the method of sizing paper, " yarns, and woven fabrics, and in machinery or apparatus " connected therewith."

These improvements are, "the employment of steam in " combination with pure starch or other sizing material " directly upon the paper, yarn, or cloth in the sizing " vessel or receptacle, or upon the surface of the sizing " roller or its equivalent." "The steam is ejected directly " upon the paper, yarn, or cloth from beneath the surface of " the sizing in the receptacle through perforations in the ends " of the branch pipes, or a slit cut in the end of each, or by " flattening the same."

[Printed, 10*d*. Drawing.]

A.D. 1862, January 21.—No. 157.

RAWLINS, James Hyndford.—(*A communication from Oliver Woodworth.*)—"Improvements in machinery used in " the manufacture of paper."

These improvements consist "in applying to a Fourdrinier " paper-making machine wherein an endless web of woven " wire is used, apparatus consisting of a roller and travelling " blanket or felt to remove the wet web of pulp from " the endless web of wire of such machine, by which " means the web of wet pulp is caused to adhere to the " travelling blanket or felt, and the two together are pressed " between pressing rollers, and then the web of pressed pulp " or paper is separated from the blanket and passes away to " be dried, whilst the travelling blanket returns to the paper-" making machine." The pressing rollers "are driven by a " steam engine or other power, and from thence the power " for moving the other parts of the machinery is derived." The paper to be dried passes over a "drying cylinder as " shown, or to other suitable drying apparatus." The travelling blanket is washed by a stream of water from a revolving fan, and is then passed between two squeezing rollers before returning into the paper-making machine. A guard "pre-" vents the water thrown against the travelling blanket " passing beyond such guard."

[Printed, 8d. Drawing.]

A.D. 1862, January 29.—No. 235.

CLARK, William.—(*A communication from Jean Baptiste Michel Auguste Siry.*)—"Improvements in the disintegration "and bleaching of textile materials for the manufacture of "paper."

These improvements are, rendering "straw, rags, alpha, "and other matters" "suitable for the manufacture of white "paper." Employing "straw prepared as in ordinary for "brown paper," which "consists in steeping the straw in a "bath of lime water; after this is withdrawn it is allowed to "ferment, or better still, is heated by a jet of steam." The straw is then disintegrated by passing between crushing cylinders, and placed in a vat furnished with "a false bottom "of wood covered with a layer of straw or broom which will "allow of the filtration of the bleaching waters. One or "more casks are placed at the bottom of the vat of different "sizes for regulating the flow of the liquids." The matters are allowed to drip, and are then watered "superficially on "the top by a rose or other distributer with water acidulated "with sulphuric acid, marking about one degree." "The "quantity of acidulated water employed is equal to about "half the capacity of the vat." After this first washing a clear solution of chloride of lime is poured on the straw, "which expels the acidulated solution before contained." "The vat is surrounded at its base with a circular pipe having "two channels, one for discharging the waste washing water, "and the other for receiving it." After the passage of the bleaching liquid, clear water is passed through until it leaves "at the bottom quite limpid. The first washing water may "be slightly acidulated with hydrochloric acid, but this is "not indispensable." "For superior kinds of paper the "straw, before any of the previous treatment, should be first "cut up by the ordinary straw-cutting machine," and then winnowed, and the knots used "for feeding cattle," "or for "making common wrapping paper."

[Printed, 4*d*. No Drawings.]

A.D. 1862, January 31.—No. 253.

LITTLEHALES, David.—"An improved plastic compound "as a substitute for papier mâché."

This consists in "the manufacture of all articles either coated "with japan, varnish, or colors, or without such coating," made from the following materials :—"Oatmeal, flour, pea, bean, rye, "barley, or linseed meal, or other farinaceous or oleaginous "meal," is mixed "with tar or other varnish until it becomes of "a thick pasty consistence," and then moulded in dies or formed into sheets as may be requisite, and then dried "in an "ordinary japanner's stove." When perfectly dry and hard it is saturated with linseed or any other suitable oil, and finished "with varnish or colour in the same manner as is well known, "and commonly done with articles of papier mâché."

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 6.—No. 319.

JOHNSON, John Henry.—(*A communication from Paul Emile Mollet.*)—(*Provisional protection only.*)—"Improvements in the preparation of pulp for paper."

These improvements are : — "Grass, especially damaged "grass, beet root, pulp, and seaweed," are steeped "in a bath "of lime water for a space of from two to twenty-four hours. "These materials may be used separately or together, or mixed "with other suitable materials." After they are taken from the lime bath they are steeped from eight to twelve hours in a mixture such as the following :—"Take of lime 20 per cent., of "salt of soda 5 per cent., of marine salt 5 per cent., and add "to them nitric acid in the proportion of from 10 to 15 parts "to 100,000 parts by weight of the solid ingredients." When removed from this mixture the materials are dried in the open air, but a close vessel is preferred "on account of the more "rapid action," "treated with phenic acid, or with tri-nitro-"phenic acid, or with carbazotic acid;" finally, after well washing with water to free the materials from the acid, "they "may be bleached by any known bleaching process."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 3.—No. 584.

HOUGHTON, Frederick Burnett.—"Improvements in the "manufacture of paper."

These improvements are, "boiling the chaff which" in *preference, is* "cut longer than heretofore, say from an inch

" to an inch and a half, to an extent sufficient to reduce the " more fibrous parts to a pulp, leaving the knots and " weeds as little disintegrated as may be, and then having " washed out the alkali a coarse 'knotter' is employed which " will allow the disintegrated vegetable matter to pass, whilst " the extraneous matters will be arrested. The pulp so " obtained will retain its fullest strength and weight and " requires the minimum of bleaching material to act upon it." The knotter preferred, "consists of a plate with square or " oblong holes sufficiently small to impede the knots and " weeds."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 5.—No. 601.

PARTINGTON, EDWARD.—" Improvements in the method of " cleansing and preparing rags, or other materials used in the " manufacture of paper, and in machinery or apparatus con- " nected therewith."

These improvements are designed "for the purpose of " economizing the water employed in such operation, and " also in saving one part of the fibrous material which " hitherto escapes with the washing water," and they consist of "a chamber having its interior surface furnished with " projections, teeth or tearing points, and being spirally " arranged. Within this chamber a cylinder revolves, having " projections upon its periphery, also spirally arranged, and " passing between the others in its revolutions, so that by " means of the propelling power of the spirally arranged " teeth, the dirty material is passed through the machine in " one direction, and subjected to their tearing action during its " progress, the course of the washing water through the " chamber being opposite so as to meet the material in a pure " state, cleanse it, and pass off through the strainer (to retain " the fibrous material) when rendered unclean." "When the " material has passed through the machine and is sufficiently " purified, a large pronged fork is thrust into it from an " opening in the side of the machine by means of a crank, " which removes as much as it can contain, and deposits it in " a receptacle provided for the purpose."

[Printed, 10d. **Drawing.]**

A.D. 1862, March 18.—No. 747.

MENNONS, Marc Antoine François.—(*A communication from Frédéric Thierry Pitoy Millot.*)—(*Provisional protection only.*)—"The application to the manufacture of paper pulps "of a vegetable product not hitherto used for that purpose."

The said vegetable product is "the stalks or branches of the "potato plant (solanum tuberosum)" which are "cleansed, "bleached, and reduced by the processes adopted in the treatment of rags and other fibrous materials, and the resulting "pulp is afterwards converted in the ordinary way into paper "and cardboard of the different qualities required."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 18.—No. 750.

BAILLY, Henry.—(*A communication from Ernest Autreux and Michel and Joseph Cotton.*)—(*Provisional protection only.*)—"Improvements in the manufacture of paper from "wood, and in apparatus used therein."

These improvements are, a machine to reduce the wood into pulp, consisting of a circular grater of tempered steel "presenting on its circumference a puncture or special cutting;" it is mounted on a stand like a grindstone, and makes "from five "to six hundred revolutions per minute;" it is surrounded with a metallic envelope, in the lowest part of which is "an orifice "serving as a tunnel (or feeder) to the water and the pulp." "In this envelope are bored in the upper part and perpendicularly to the axle one or several openings serving as "receptacles to the blocks of wood," which are forced by weights against the grater; near the middle of the circumference of the grater are two taps from which a jet of water flows and detaches the pulp from the grater, forcing it into the lower part of the envelope and into a frame, "from which the water "escaping leaves the pulp almost dry and easy to be transported to the cylinders to finish its entire preparation, to "whiten and fix itself by the ordinary methods employed for "pulps of rag." This pulp is employed by itself or mixed with rag pulp "in any proportion; it can be shaded any "color." It makes "excellent cardboard." "It can absorb "a larger proportion of mineral matters, such as plastic or "white clay, requires less or no hard labour, &c."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 27.—No. 852.

VERNÈDE DE CORNEILLAN, Jeanne Louise Henriette Clémence Comtesse de.—"Improvements in treating open "cocoons of silk worms, and in converting the waste resulting "therefrom into paper."

First, different methods for the decortication and drawing out of raw silk from the cocoons naturally open.

Second, the treatment of cocoons "in which an orifice or "opening is made only by the crysalis in escaping into the "butterfly state."

Third, the employment of the waste resulting from the above treatment which is utilized "by carding or by cottonizing, or by transforming into paper." The waste is cut, carded, and "bleached by successive immersions in boiling "alkaline and soapy lees, in oxygenated muriatic acid, or "in sulphuric acid." The waste is subjected "to the vapor "of sulphur for from 12 to 15 hours," sometimes repeating "the exposure to sulphur vapours several times," thus obtaining a species of brilliant cotton, silver grey, or white, "according to the energy of the bleaching processes." Sometimes also using "solutions of caustic soda and lime to expedite "the bleaching." "In addition to the ordinary uses for "cotton," this "cotton may be used for gun cotton or paper. "For paper, it is made into a pulp in an ordinary pulping "engine, bleached with sulphur, and treated in the ordinary "manner for converting pulp into paper."

[Printed, 4*d*. No Drawings.]

A.D. 1862, April 25.—No. 1213.

ROBERTS, Richard Percy.—(*Provisional protection only.*) —"Improvements in the preparation of paper for copying "letters and other documents, and in the preparation of "copying ink."

First, in preparing the paper impregnating it with glycerine or glycerine together with tannin or oxalic acid, "or glycerine together with sub-carbonate of potash, or glycerine together with tannin and sub-carbonate of potash." The paper may then be made into books, and "letters and "other documents may be copied upon it by simply placing "*the letters on the* paper and pressing the book in a press,

" the leaves being separated in the ordinary way by what are " known as oil sheets."

Second, "the improvements in copying ink consist in com- " bining glycerine, molasses, and the seeds known as albe- " moschus with ink making materials; the following is the " composition of the ink" preferred:—"Distilled or other " water 1 gallon, logwood chips 8 ozs., gum arabic 1 oz., " molasses 1 to 2 ozs., sugar candy 1 to 2 ozs., alleppo-galls " bruised 8 ozs., bi-chloride of mercury 5 grains, albemochus " 10 grains, alcohol 1 oz. precipitated black rubbed up with " a little mucilage 10 grains."

[Printed, 4*d*. No Drawings.]

A.D. 1862, April 25.—No. 1217.

REED, CHARLES.—(*Provisional protection only.*)—"A new " method of treating the sorghum, saccharatum, or holcus " saccharatus in order to obtain saccharine liquor and pulp " therefrom."

This method consists "in taking the plant after it has " been cut and in passing it between rollers, or in subjecting " it to pressure in a hydraulic or other suitable press to " express the juice and partially prepare the fibre. After " the juice has been expressed, or the dry plant may be " taken impressed, the plant is cut, subjected to a boiling " caustic alkali, is bleached and converted into pulp in a " pulping engine." The juice is dealt with for sugar or spirit.

[Printed, 4*d*. No Drawings.]

A.D. 1862, May 3.—No. 1317.

HENRY, MICHAEL.—(*A communication from Jean Baptiste Vasseur and Xavier Lamotte.*) — (*Provisional protection only.*)—"Improvements in the process of and apparatus for " preparing materials for the manufacture of paper, and in " obtaining products from agents used in the said process, " part of the invention being also applicable to apparatus " for washing."

These improvements are, in reference to this subject, as follows:—Hitherto the materials have been operated upon in masses or heaps and it is now proposed to separate them " into thin layers or strata, which are divided or separated

" from each other," and in that state "undergo the boiling, " heating, steaming, alkaline treatment, washing or other " disentegrating or preparing process or processes ; moreover, " while the process is being carried on" the materials should be kept from contact with the sides of the boiler, heater, or other vessel, so that they may "be separated, stirred, or " moved about during the treatment." For this purpose " a number of baskets or trays constructed of wire work or " perforated or reticulated metal, and connected by a brace " framing or mounting are placed in a vertical boiler or " receiver, and are so arranged that they fit into one " another, one entering the other to about or rather less " than half its depth." This "arrangement may also be " adapted to horizontal boilers or receivers. A small railway " may be used to convey the baskets or trays, or the baskets " or trays may be enclosed in a larger basket or tray re- " volving within the boiler or receiver." In some cases the boiling is carried on for 3 or 4 hours under a pressure of 4 atmospheres. After the boiling the leys are drawn off and the materials washed in pure water under the above pressure. The washing may be repeated as desired. The materials taken from the apparatus may in some cases be treated with an acid bath (of cheap acid) or dried in their full length and bleached as rags are, or "bleached in their entire length by " separating and insulating them" when dry or wet.

[Printed, 4*d*. No Drawings.]

A.D. 1862, May 10.—No. 1403.

CLARK, William.—(*A communication from Jean Louis Abeilhou.*)—"The application of a vegetable fibre alone or in " combination with other matters in the manufacture of felted " and other fabrics, also a substitute for flock or powdered " wool, and as a material for padding or stuffing and for other " useful purposes."

The said vegetable substance is the down from the flower of the "aquatic plants technically termed 'typha,' and " commonly known as reeds or bulrushes." "In the months " of August, September, and October when the blossom, " flower, or fruit of the typha has arrived at maturity it is " *gathered and* the leaves stripped off, after which the down

" is placed in a dry and airy situation." When dry, it is placed on screens of wire "similar to those employed by wool " beaters; the down is beaten with two wooden rods, during " which time the seeds become separated from the down and " fall through the grating, while the down rises up in the air " and then falls upon the grating in white flakes similar to " snow," and is purified by means of "an arçon (an instrument used in hat making)," by which means it is worked " until it possesses the fineness of silk and has a silvery appearance." In these two operations a beater may be " substituted for the gratings, and the arçon by a blower or " card, which apparatus are well blown, or the same results " may be obtained by using chemical products." "The down " of the typha being short," for many purposes it is mixed with longer fibrous materials. It may "be used with " advantage in the manufacture of paper generally, and " particularly in that of rice and china papers," &c.

[Printed, 4*d*. No Drawings.]

A.D. 1862, May 15.—No. 1475.

BAGGS, Isham, and SIMPSON, William.—"Improvements " in treating straw, Spanish grass, and other vegetable fibres, " in preparing a bleaching agent for vegetable fibres, and in recovering and treating an alkali resulting from the treatment " of the said fibres, and in apparatuses employed therein."

These improvements are, in reference to this subject, first, in separating and removing the silex from straw, Spanish grass, and other vegetable fibres, "by subjecting the fibres to the action of " hydro-fluoric acid in a gaseous or liquid form." The straw or other vegetable fibres, after having been cut in lengths not exceeding one inch, is fed into a cylinder or other vessel, " closed except at points for the admission and discharge of " the straw or other fibres acted upon." Inside this cylinder is "an archimedian screw, the axis of which is perforated, " and is made to communicate at one end with a supply of " hydrofluoric acid gas, which may be generated in a leaden " still from a mixture of powdered fluor spar and oil of vitriol " or other suitable materials developed under heat." The neck of the retort is connected "with the hollow axis of the " screw through a leaden pipe working in a stuffing box and ubing," and to which pipe is "a pipe llows, and provided with regulating mospheric air is admitted, when and in quired to dilute the gas." The screw is ying the fibres, and "the gas removes " "The fibres, on reaching the further are delivered into receivers or "boilers, the action of caustic alkali." When the is used in a liquid form, in preference it is temperature of about 212° F." for from one hour

covering the alkali "which may be used again in atment of vegetable fibres or otherwise." The liquor, after boiling the fibres, is caused "to trickle in showers through roses or perforated pipes upon ed metal tubes," in preference placed horizontally; the posit on the tubes of a solid matter, when a sufficient quantity has accumulated, is scraped off the tubes and calcined in retorts—the residue "is caustic alkali." "Instead of the "liquor being evaporated upon tubes heated cellular plates "or slabs may be employed."

Third, "in manufacturing chlorine or bleaching agent for "straw and other vegetable fibres," as follows:—In a retort is placed chloride of sodium, sulphuric acid is introduced by tubes with funnel mouths into it, or "the ordinary "apparatus for the generation of muriatic gas may be "used." The gas is passed into a second vessel containing "black oxide of manganese and water, the materials which "decompose muriatic acid give off chlorine;" heat is generated, and the chlorine evolved "may be either conducted "into a chamber containing slacked lime," or "into a cistern "containing a mixture of fresh lime and water," and well stirring the same. In preference employing "an exhauster "to effect the more ready passage and consequent decomposition of the gas."

[Printed, 4d. No Drawings.]

A.D. [illegible], May [illegible].—No. [illegible].

[illegible], Robert.—(Provisional protection only.)—"Improvements in the preparation of materials for sizing

" dressing, and finishing warps, yarns, textile fabrics, or " paper, and also for thickening colours."

These improvements are, treating " flour of wheat or other " cereal grain, rice, sago, or other amylaceous substance or " substances with diastase for the purpose of procuring a " gummy matter," with which is incorporated " lapis calimi- " naris, terra alba, and aluminá to any required extent for " the purpose of obtaining a compound suitable " for the above uses.

[Printed, *4d.* No Drawings.]

A.D. 1862, May 30.—No. 1624.

DATICHY, Florimond, and SABATIER, Eugene.—" Im- " proved machinery and process for making pulp for the " manufacture of paper and other purposes."

The raw material is subjected to a regulated heat in a stove or enclosed chamber. A new (dry action) cylinder machine consists of a large fluted cylinder rotating upon its axis, and giving motion to a number of smaller cylinders or rollers (also fluted), and by which the large cylinder is is partially surrounded; between the large and small cylinders the materials are subjected to a peculiar semi-crushing and semi-grinding process. A mill with a suitable hopper receives " the materials from (and partly prepared by) the " cylinders; by this mill the materials are reduced to a fine " lint-like fibrous or pile state; this completes the first stage " or dessicated process." From this mill " the stuff falls into " a cistern or vessel containing a suitable dilute or chlorinated " water, in which it is steeped for a short time, and is thence " drawn through an air-tight conduit into an exhausted " steaming cylinder," " fitted internally with disk agitators " and connected " with a boiler or steaming apparatus." In certain cases the steeping cistern may be dispensed with, and the materials from the mill " run directly into the " cylinder in which the chlorinated or other liquid may be " placed and the first bleaching operation performed. The " materials in a state of pulp are now subjected to a rapid " motion and a volume of steam simultaneously, and are then " removed into a second bleaching or washing and cleansing " cylinder in which they are finally dried by exhaustion and " pneumatic action."

[*Printed, 1s. 2d.* Drawings.]

A.D. 1862, May 31.—No. 1645.

WATSON, Henry, and MILLBOURN, Joseph.—"Improve-" ments in pulp strainers or knotter bottoms."

These improvements are "applicable to such as are com-" posed of a series of bars with spaces between them in " contradistinction to those in which the requisite spaces " are produced by cutting or forming slits in plates;" and they consist in this, that—whereas "such bars have " been combined into one complete knotter bottom, which " in case any part of it became defective had to be re-" moved"—by these improvements "a pulp strainer or " knotter bottom is composed in a series of sections or pannels, " each formed of a number of bars, which are combined by " screw bolts and nuts or fastenings. Several of these sec-" tions or panels are placed and retained securely in a " suitable frame" in such manner as "will admit of any one " or more of the sections or panels being readily removed " in case being of their defective," and of others being introduced in their place; and "such construction also offers " the further advantage, that when it is desired to change the " pulp strainer or knotter bottom for a finer or coarser one, " then the several sections or pannels of the one previously " in use may be removed, and proper sections or panels " of another gauge introduced, which is more readily done " than changing a knotter bottom not so made in sections." The bars, in preference of brass, are carefully shaped; "each " bar has a hole bored at each end, and the bars are " assembled and held together to form a panel by means of " bolts;" "the outermost bars of the pannel have countersunk " holes in them to receive the heads of the bolts and their " nuts." The frame to receive these panels "is rectangular " and made of iron plate rolled with a rib upon it;" a bar, also, runs along the centre; this bar, in conjunction with the ribs on the plate, serves to support the panels. "The " panels are held down in their places all round the edges " of the frame by strips attached to the plate by means of " screws," &c.

[*Printed*, 1*s*. Drawings.]

A.D. 1862, June 2.—No. 1665.

LLOYD, EDWARD.—"Improvements in machinery for the "manufacture of paper."

These improvements are, first, operating "upon vegetable fibres (preparatory to converting them into pulp "for the manufacture of paper) in a close vessel or boiler, "either fixed or moveable, and provided with a perforated "false bottom or lining and into which boiler or close vessel "steam, water, or air is or are admitted." As an example, chopped straw is rammed down close into the boiler half or two-thirds filled with ordinary alkaline liquor, and steam is admitted into the boiler, which may be made to revolve. After about six hours the liquor, is drawn off by stop-cocks or pipes through the false bottom; clean water, hot or cold, may then be let on through the pipes, the boiler set in motion again for a few minutes, when the pipes are again opened and steam let into the boiler; the dirty water is forced out. This operation of washing may be repeated as often as may be required, and finally, a volume of steam under pressure may be admitted for well squeezing the fibres.

Second, "lining the sides and bottom of the bleaching, "poaching, and beating vessels with perforated metal, so that "the liquor may be drawn off without removing the fibres."

Third, "countersinking the holes made in the perforated "metal employed in the bleaching, poaching, or beating "vessel, and also in the close vessel or boiler." These holes are countersunk on the under side of the inside casing.

Fourth, "adapting to the delivery end of the paper-making "machine, a shifting or moveable table to receive the paper "as it is delivered from the machine." The table is on anti-friction rollers; "an end-way motion is communicated to it by "means of a horizontal vibrating lever" mounted on a vertical shaft, "which is connected with the ordinary counting apparatus, and to which a rocking motion is communicated at "intervals from any of the moving parts of the machine that "may be conveniently placed for the purpose."

[Printed, 10*d*. Drawing.]

A.D. 1862, July 19.—No. 2066.

SAUNDERS, THOMAS HARRY, and MILLBOURN, JOSEPH.—"Improvements in the manufacture of paper."

These improvements are, first, in drying paper, in place of the paper being carried "along in contact with heated rollers or cylinders" by which "its texture or strength is somewhat impaired," causing "the paper to pass over or "round a series of skeleton drums or frames rotating or "otherwise," and during its passage submitting "it to "currents of air which will carry off the moisture without "impairing the solidity or strength of the paper." A series of skeleton cylinders are placed at the end of the paper-making machine, over and under which the paper is passed; the cylinders are covered externally with open wirework, and inside "are placed rotary fans to which motion may be com-"municated for the purpose of creating a current of air," as described in No. 8310, Old Law. "These rotary fans may, "however, be dispensed with, and steam pipes or flues may "be placed beneath the skeleton drums for the purpose of "heating the air, which as it rises up will dry and toughen "the paper."

Second, "regulating the supply of pulp to the paper-making "machine by adapting to the bottom or lower part of the pulp "vat a series of valves which are capable of being adjusted to "a great nicety, so that the attendant can with great facility "regulate the quantity of pulp supplied to the machine, and "consequently the thickness of the paper when made."

[Printed, 10*d*. Drawing.]

A.D. 1862, July 22.—No. 2091.

VAUTIER, ANTOINE CONSTANT.—"Improvements in obtaining "fibrous materials, and in manufacturing paper pulp, also in "preparing, bleaching, and treating fibrous materials and "fibrous and textile fabrics, and in producing agents used in "part of the invention."

These improvements are, in reference to this subject, manufacturing "paper pulp from various trees, shrubs, and plants, "and parts and products thereof;" "if their fibres are too "long, they may be reduced by rag-reducing machinery;" cooking the matters (once generally sufficing), in preference, "in a solution of lime or of soda or potassa, with or without "lime, or a combined alkaline or "saline solution," after *which rinsing them* "in warm or cold pure water or in lime

" water alternated with acid washings or not;" next steeping "the matters in baths of chloride of lime or of alkaline " hypochlorites," repeating "these chloride or hypochlorite " baths, alternating them with acid and sometimes with " alkaline or lime baths until the matters become reduced " to a fine white and homogeneous pulp" without "using " any mechanical means of reduction." "Instead of sub-" jecting the matters to the disintegrating and bleaching " action of chlorides or hypochlorites as just described," sometimes pursuing "the first cooking, boiling, or simmering, " or soaking in alkaline, lime, saline, or acid liquors, and " washing till the pulp becomes fine and homogeneous, it may " be afterwards bleached in any ordinary manner." By "this " process a superior pulp is obtained without any mechanical " reduction from straw of corn, rye or oats, grasses, plants " used as fodder, plantains, esparto, reeds, rushes, fir leaves, " diss, dwarf palm or palmeto, and other palms and plants; " also from detritus or ligneous residue of beet root and sugar " canes (cane trash)," &c. "Leaves, stalks, and plants may " be converted into paper pulp by a continuous operation " without drying the matters before the end of the process."

[Printed, 10*d*. No Drawings.]

A.D. 1862, July 28.—No. 2136.

NOBLE, Alfred.—"Improvements in obtaining and treating " compounds of alumina."

These improvements are, in reference to this subject, obtaining a preparation of alumina, which for many purposes may be used as a substitute for alum, as follows:—Clay or other material containing alumina is ground to a fine powder, calcined in a reverberatory furnace at a low red heat, and exposed to the action of hydrochloric acid gas (from making salt cake or otherwise), "care being taken that the " temperature of the gas is somewhere about 200° F." "If " the temperature is too high no action will take place, and " if too low the compound will become partly liquified." " When the operation has been successfully performed the " resulting substance," which is called "crude chlor-alum is in " a dry state." The apparatus "suitable for carrying on this " operation consists of a chamber built of sandstone, brick,

" or other material little acted on by hydrochloric acid, and " furnished with shelves of the same material arranged in " such a manner that the current of hydrochloric acid gas " shall circulate over each." "The crude chlor-alum" is purified from iron and free acid by keeping it heated with stirring until hydrochloric acid gas ceases to be evolved, " between 212° and 240° F., and it is well to pass a current " of air over it," by which means "all free hydrochloric acid " is driven off and the greater part of the chloride of iron in " it becomes decomposed, hydrochloric acid being driven off " and oxide of iron remaining." Chloride of aluminium thus prepared dissolves in water, leaving oxide of iron and silica undissolved, and these are removed by filtration or subsidence. " By this means an almost pure solution of chloride of " aluminium is obtained, and is suitable for the use of the " dyer, paper maker," &c.

[Printed, 4*d*. No Drawings.]

A.D. 1862, July 28.—No. 2142.

JULLION, John Louis. — (*Provisional protection not allowed.*) — " An improvement in anti-chloride for paper-" making."

This improvement consists in exposing the sulphurets of calcium, "known as either soda waste or as gas lime, to the action " of atmospheric air until nearly all the sulphuret of calcium " is oxidized into hyposulphite of lime; dissolving this out " with water, destroying any remaining sulphuret that may be " in solution with an acid (such as sulphuric and muriatic)," and evaporating "the resulting liquor to dryness or to a " strength that the salt will crystallize as may be required."

[Printed, 4*d*. No Drawings.]

A.D. 1862, July 29.—No. 2155.

HENRY, Michael.—(*A communication from Jean Baptiste Vasseur and Victorien Joseph Janssens.*)—"Improvements " in obtaining fibrous materials and paper pulp; in treating, " cleansing, and scouring fibrous materials and fabrics manu-" factured thereof; in producing soap for the said operations, " and in obtaining products from liquors used therein."

These improvements are, in reference to this subject, "the manufacture and application of an improved soap suitable for employment in obtaining fibrous materials and paper pulp from plants." The soap is produced by combining caustic alkalies in considerable proportions, but not sufficient "to dissolve, destroy, or injure animal or vegetable textile fabrics, while, nevertheless, retaining their disintegrating power, that is to say, their power of setting free, cleansing, or separating the fibres from the other or extraneous matters." "The caustic soap is manufactured by combining a concentrated solution of caustic alkali with a saponifiable material in a fluid state, and then stirring and agitating the mixture and leaving it to stand or at rest." "Resinous bodies and essences may be used" by "dissolving them in the alkali before adding the other or saponifiable ingredient." In "treating any particular plant, an oil or fat obtainable from that plant may be combined with the alkali" in making the caustic soap. "The degree of causticity of the alkali may be varied according to the nature of the matter to be treated with the soap. Flax, hemp, plants of the nettle tribe, and other plants having a boon, straw, or woody part, chaff, husk, awn, or like formation may be taken as they are gathered" and "treated in that state with the caustic soap," obtaining simultaneously "fibrous materials and paper pulp." "Matters treated or disintegrated with the soap may be afterwards washed without being removed from the vessel in which they had been treated" by "merely pouring off the disintegrating liquor and pouring clean water into the vessel, and then heating." "For this purpose, it is preferred to use a close boiler, in which the materials to be used are disposed in thin layers, over each of which an open work, perforated, or reticulated diaphragm or surface is laid so as to press gently on the materials and keep them down, thereby preventing the fibres from entangling; they may be washed in pure water without steam pressure, or they may be steamed." "By using this soap, paper pulp may be manufactured from tow refuse and the waste of spinning factories." The solutions of the caustic soap after use, treated with an acid, sulphuric and sulphurous acids preferred, precipitate "picric acid." "The residuary acid solution

" having an alkaline base may be concentrated by evaporation," and what is named "caustic soap may be manufactured there- " from."

[Printed, 8*d*. Drawing.]

A.D. 1862, August 6.—No. 2203.

BURDON, William Wharton.—" Improvements in reducing " wood fibres to pulp."

These improvements are, employing "fixed stones, rasps, " or other like reducing agents, and in passing blocks " or pieces of wood across the grain or fibre thereof, over, " under, or upon such stones or reducing agents." Employing " water to assist the reduction of the fibre and to carry off " the pulpy mass." Or the wood is reduced to pulp by " rubbing stones upon wood across the grain thereof." In some cases it is "advantageous to soften the wood by steam or " by boiling water or in an alkaline solution;" also using the wood "in the state of shavings or sawdust as well as blocks."

[Printed, 4*d*. No Drawings.]

A.D. 1862, August 22.—No. 2350.

BOTTOMLEY, George.—(*Provisional protection only.*)— " Improved apparatus for expressing moisture from pulpy or " solid substances."

In preference, metal plates are used perforated in lines or circles and the under side cut out in grooves communicating with the perforations; two of these plates are placed back to back with the grooved sides inwards, and on the perforated side "a portion of the pulpy material or sub- " stance to be operated" upon is placed and "two more " plates are then placed thereon and then more of the pulpy " material, and so on until a considerable quantity of pulpy " material having perforated and grooved plates intermingled " therewith is placed in the press, and upon pressure being " given the liquid or watery particles will exude and pass " through the perforations." "These plates should be covered " with felt or some fabric." Instead of plates, bars or blocks made in a similar manner may be employed.

[*Printed, 4d.* No Drawings.]

A.D. 1862, August 27.—No. 2372.

HARBEN, Henry.—(*Provisional protection only.*)—"Im-" provements in the manufacture of paper and other produc-" tions in which fibrous material is employed."

These improvements are using "seaweed or other aquatic " vegetable production," cleansing the same "in fresh " water," and steeping the "same in naptha or spirits of " wine, or in a mixture of either of them and water, or in " chlorine, or in any gas or liquid, or composition posses-" ing the requisite bleaching properties." When sufficiently prepared reducing "the material into pulp by " the usual or best known process." "The weed or other " aquatic vegetable matter may be scarified before reducing " into pulp. Some description of weed or plant after cleansing " in fresh water may be bleached sufficiently by the sun or " air."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 1.—No. 2415.

GEDGE, William Edward.—(*A communication from Francois de Rindac.*)—(*Provisional protection only.*)—"Im-" provements in apparatus for washing the felts of paper " making machines."

These improvements are a "receiver or reservoir fed by " a current constantly renewing and keeping the water [in " the receiver at the same level," placed "beneath the felt " coucher, which is brought to it by rollers when returning " empty or uncharged. In the apparatus and beneath the " water are two parallel rollers working the one towards the " other, and exercising on the felt which passes between them " a pressure which purges it from the foreign and earthy " matters with which it may be charged." On leaving this bath the felt passes through two other rollers covered with felt or caoutchouc. "The receiver or reservoir may in some " cases be suppressed, and two or more watering pots or pipes " be substituted which will constantly sprinkle or souse the " felt in its passage. This arrangement may be adapted to " any machine."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 29.—No. 2645.

ELLIS, Henry.—"Improvements in the manufacture of com-"pounds of silica, and in the application of certain com-"pounds of silica to mineralize woven fabrics, paper, and "paper pulp, to harden and preserve stone and cement, in the "production of artificial stone and paint, and in the produc-"tion of glazing of porcelain and such like manufactures."

These improvements are precipitating "compound silicates "out of solutions of silicate of soda or of potash by means "of solutions of any of the salts of the metals or of "the earths," at once washing the precipitates and redissolving them "in as much as may be sufficient of a solution "of silicate of soda, or of potash, or of both." Boro-, "phospho-, and chromo-silicates are made by mixing saturated solutions of borate, phosphate, and chromate of an alkali "with an equal quantity by measure of solu-"tions of silicates of soda, of potash, or of both of about "1·2 sp. gr. and then precipitating by means of solutions of "the metallic or earthy salts and washing and redissolving "the recent precipitates so obtained in the manner described." "Lignolite tracing paper" and also "lignolite tables and "drawing paper" are made, the first "by applying any of "the above-named solutions thoroughly saturated with any "gelatinous silicate" to ordinary tissue or other thin paper, the second by applying similar solutions to paper or cardboard, "although ordinary paper or cardboard will answer the pur-"pose," in preference, paper or cardboard combined with mineral matter for lignolite tablets is used, in which also mineral pigments such as colored earths and oxides of metals may be added for the sake of the "tints." The proportion of mineral matter may be 25 "parts of the mineral matter to 75 "parts of paper pulp, the mineral matter to include from "1 to 10 parts of an earthy or metallic carbonate, but the "per-centage of mineral matter may be greatly varied." It is found "advantageous when treating ordinary or unminera-"lized paper to add carbonates such as those of zinc and "magnesia or kaolin or alumina to the solutions." Solutions of chloride of lime, alum, and sulphate of copper are added to solutions of silicate of soda or of potash and the precipitate *washed and in* each case redissolved "in a sufficient quantity

" of a solution of silicate of soda or of potash." Mixed with " paper pulp the silica solutions will farm a paste that may " be cast in moulds to form picture frames and such like " articles, and which paste may also be made into tubes. " Paper pulp for this plastic material may be largely com- " bined with mineral matter." "By means of such solutions " and also of commercial silicates" of soda and of potash manufacturing "lignolite paints." "The body of the paints " is to be paper or paper pulp preferably paper largely com- " bined with mineral matter, or paper pulp mixed with mineral " matter." "The coloring matter of the lignolite paints" is introduced "into the body of the paper. All oxides, " minerals, and earths may in a state of impalpable powder " be used for the purpose." The above solutions are applied " for making writing slabs," by adding to any of them "any " mineral of sufficient hardness in an impalpable powder and " a pigment, such as drop black," and applying it by a brush to paper, cardboard, wood, or any other suitable material. " When paper is used" it may be mineralized in the "same " manner as described for paper pulp and lignolite paints, but " for this purpose, preference should be given to minerals the " hardness of which on Mohs' scale is 5 or more."

[Printed, 6*d*. No Drawings.]

A.D. 1862, October 9.—No. 2729.

PALSER, JOSEPH BENCE.—"Improved apparatus for manu- " facturing paper pulp and recovering the alkali used in such " manufacture."

This apparatus consists, in reference to this subject, as follows:—To reduce straw and other fibrous materials to pulp by the " action of an alkaline solution in rotating boilers, " under a pressure of from 110 to 130 pounds to the inch or " thereabouts," for this purpose a pair of cylindrical boilers are mounted over a reverberatory furnace in separate compartments. The straw or other material "is first cut into suitable " lengths, subjected to the winnowing process and then crushed " between a pair of rollers." Supposing one of the boilers to be just emptied of its contents and that the operation of boiling under a high pressure in the other boiler is just completed, " the empty boiler is filled with the prepared straw or other

" substance through a manhole," and the manhole is then closed. A solution of caustic alkali "from 3½° to 3¾° Baumé" in "the proportion of 60 gallons of the liquid to every 100 lbs. " of the cut straw is run into the boiler, and the boiler is set " in rotary motion. The fire heat is cut off from the adja- " cent boiler by dropping a damper and admitted by the " raising of another damper" to the boiler last charged with fibrous material. Steam from the heated boiler is also turned into it until the temperature and pressure are equal in both boilers, when the steam way is closed by a tap and a tap is opened into a pipe leading to a vat heated by blasts of hot air, placed above the boiler. "The steam remaining in " the boiler that is to be cooled will now force up the ex- " hausted liquid into the vat" above the boiler, and this is partly evaporated in the vat by furnace heat and blasts of hot air, and becomes viscous when allowed to fall gradually on the top of the rotating boiler that is immediately below, and ultimately it is collected and calcined in a reverberatory furnace, and when cool it is fit for use. The fibrous materials after " having been subjected to a pressure of about 130 lbs. for say " about 4 hours more or less according to the quality of the " material," are found to have lost their adherent character. Water is freely supplied to the boiler, and after thorough cleansing the stock is removed from the boiler through the manhole. If more washing is required "the pulp may be " placed in a tub fitted with a false bottom and connected with " a head of water," and washed "by letting in water below " the false bottom the material will be forced upwards and " kept in agitation, whereby any dissolved matters remaining " therewith will be effectually washed out. The fibrous " material reduced as above described is now ready to be " subjected to the well-known processes requisite for convert- " ing it into paper."

[Printed, 10*d*. Drawing.]

A.D. 1862, October 10.—No. 2733.

GREEN, ROBERT ELLIS, and COCKCROFT, JOHN.—"An " improved amalgamation of materials forming a substance " suitable for printer's blankets, conductors used in paper- " *making*, *packings* for joints and similar purposes."

The "application of a solution of india-rubber or its substitute to paper alone, or in combination with fabrics" as follows: "two or more lengths of paper are combined by means of a solution of india-rubber or its substitutes" by spreading it between them and pressing them together." Or "a textile fabric such as linen, cotton, or woollen," is put on the outside with paper underneath, always making the different folds adhere with a solution of india-rubber or its substitutes. "For printers' blankets it must be adapted to the peculiar colors used by the printer, as some colors are strongly acid, some alkaline, and others neutral." For paper makers' webs, in preference, using folds of woollen paper "with a textile fabric at the back." For washers for steam joints joining "any suitable number of any of the above materials together," and submitting "them to pressure and heat or other drying process."

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 25.—No. 2880.

GHISLIN, Thomas Goulston.—"Improvements in the treatment and utilization of certain foreign plants for the obtaining of useful fibres therefrom."

These improvements are the use and application of the "class of bulbous plants of the liliaceous and amaryllidaceous orders," "in order to obtain the useful fibres therefrom." The fresh bulb is boiled in water, and the soft pulp is pressed or submitted to centrifugal apparatus; the resulting fibre is washed, subjected "to the action of steam at a suitable pressure," and dried "by exposure to the air or in a heated atmosphere." The fibre thus obtained it is proposed to card, draw, and spin in the "usual way." When the bulb is dry, the outer cuticle is stripped off, the bulb is boiled in an alkaline solution, and afterwards the alkali is neutralized by weak acid. The fibre is next subjected to a bleaching process using either gaseous chlorine or chloride of lime, or any other material commonly employed for this purpose. "The bleaching agent is then removed by washing and the moisture by pressure or centrifugal apparatus," then "wash the fibre in water, open it out by steam, and dry by exposure as in the former instance." Sometimes modifying the treatment of the bulbs by commencing "steeping them in " diluted acetic acid, then steaming and afterwards tearing the " bulb to pieces by some mechanical contrivance so as to " separate the fibre," or the bulbs are damped and crushed " mechanically so as to separate the fibre.

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 31.—No. 2936.

ASTROP, William.—(*Provisional protection only.*)—"Im-" provements in the manufacture of paper."

These improvements are employing "the fibrous portions of " the roots of parsnips, carrots, and turnips of all kinds, and " of the roots, stems, and stalks of the beet, mangold wurzel, " chicory, and rhubarb plants for the manufacture of pulp for " paper and cardboard, either separately or in combination " with each other, or in combination with any of the pulps " now ordinarily used for these purposes."

[Printed, 4*d*. No Drawings.]

A.D. 1862, November 10.—No. 3034.

GHISLIN, Thomas Goulston.—"Improvements in the treat-" ment of certain foreign plants, and in the application of the " fibres derived therefrom."

This invention relates, to the treatment "of the following " South African plants, their families and species, viz., oxa-" lideæ, hibiscus and other malvaceæ, virgilia, bryonia, gnapha-" lium, ficoideæ, salicornia, euphorbiaceæ, urticeæ, ficus, pro-" teaceæ, cycadeæ, phœnix reclinata; indeæ, including Watsonia " humilis and others; gladiolus, antholyza, laperousia, bar-" biana, witsensia, tritonia, and sparaxis; juncaceæ, serratus, " and trista; various restiaceæ, cyperaceæ, and gramineæ; " holchus saccharatus, maize, and stypa," in order to obtain from them "fibres of various characters or qualities," which may be applied to manufacturing purposes. The plants are steeped or retted in a weak alkaline solution, and afterwards in a weak solution of sulphuric acid; or they may be first boiled in the alkaline and then steeped in a cold acid solution, and they are then subjected to the frictional action of a rotary brush, while held and gradually advanced towards the brush *by rollers;* by these means the woody, gummy, and nonfibrous parts of the plants are removed from the rest, and " the fibres are then washed well in cold water and left to " dry."

The inventor states that by using the plant trista when young he produces "a kind of flax by the processes of boiling " and opening out the fibres, which fibres may, either be " spun into yarn or reduced to pulp for making paper."

[Printed, 4*d*. No Drawings.]

A.D. 1862, November 24.—No. 3150.

CLARK, William.—(*A communication from Désiré Mathurin Legat.*)—"Improvements in the means of obtaining a " vacuum or partial vacuum as applied in the manufacture of " paper."

These improvements are, in place of applying the ordinary pumps to produce a vacuum "for extracting water and air from " paper pulp before it passes to the first drying rollers," applying " a hydropneumatic self-acting apparatus with converging " and diverging cones similar to those used for feeding steam " generators, except that in this case the motor is water, " which in running rapidly through a central cone creates a " vacuum in another cone surrounding it which communicates " with the space in which the vacuum is to be obtained." " One of the principal advantages of this arrangement is the " absence of any moving parts for creating the vacuum."

[Printed, 10*d*. Drawing.]

A.D. 1862, November 28.—No. 3186.

CARBONELL, Joseph. — (*Provisional protection only.*)— " Improvements in preparing, manufacturing, and washing the " paper pulp derived from the esparto plant, and in apparatus " connected therewith."

These improvements are as follows, "200 lbs. of the esparto plant or spartium in stalk, in the raw state," is placed in a vat or trough and mixed with "20 lbs. of alkali or " salt of soda and 30 lbs. of quicklime," and the spartium is covered with water. The whole is boiled for 4 hours by steam through perforated winding copper pipes. The liquid is drawn off and the spartium pressed in a hydraulic press, and mixed with 50 per cent. of clear cold water, is triturated for

15 minutes in a cylinder such as is used for triturating rags, and becomes reduced to a fibrous matter, when "24 lbs. of " chloride of lime thoroughly dissolved in clear water" is added, and the cylinder turned "until the chloride is well " mixed with the spartium." "1½ lbs. of sulphuric acid " marking $66^{\circ}/_{0}$)" are treated with 3 lbs. of cold water, and this liquid is poured "by degrees upon the pulp which imme- " diately assumes a reddish colour, but at the expiration of " about 45 minutes it becomes again and remains perfectly " white. There remains but to warehouse the pulp for " 24 hours, and it is fit for paper making."

[Printed, 4*d*. No Drawings.]

A.D. 1862, December 8.—No. 3284.

SELLARS, John.—"Improvements in the manufacture of " pulp or half stuff used in the manufacture of paper, paste- " board, and similar articles."

These improvements are manufacturing pulp or half stuff for the above purposes of the "fibrous and skinny por- " tions of potatoes, whether they may be mixed with some " small portion of the farina or not, or mixed with other pulps " or substances." The potatoes are washed and put into a strong solution of salt and water, strong enough to make them float. If the pulp is for fine paper, they are stripped of their skins, rasped or disintegrated, and the product thinned down with cold water "to such a consistency as will allow the farina " to pass through the usual sieving apparatus." The farina may be further extracted if required by further disintegration of the material by rollers, millstones, &c. The fibre is now cleansed by repeated washings in a churn-like apparatus, until the fibre is white enough for many sorts of good paper, but when a very pure white is required "a weak solution of chlo- " ride of lime or other solution," thrown into the vessel "soon " brings it to the desired color," some of the bleaching agent is washed out and the remainder neutralized in the beating engine "by any of the well-known means." The pulp is then taken out of the vessel and pressed, and is "conveyed to the " paper mill in damp state." The starch is placed in tuns and well washed, any fibre is carefully separated and mixed with the fibre already obtained.

[Printed, 4d. No Drawings.]

A.D. 1862, December 10.—No. 3306.

LAMB, JOHN.—" Improvements in the manufacture of tissue " paper for transferring patterns and designs."

These improvements are, in making tissue paper, in place of applying "the size to the surface of the paper before the " impression is printed upon it," "combining the size with " the pulp in the ordinary rag engine or other machinery " employed in preparing the pulp for the paper-making " machines, or in combining the size with the water with " which the pulp is diluted previous to or when supplied to " the paper-making machines, or in sizing the paper in its " progress through the paper-making machines." It is " most beneficial to apply the size in the rag engine in " the following manner:—When the ropes or other fibrous " materials have been partially pulped," adding "4 or 5 lbs. " of alumina or alum to every 100 lbs. of pulp, and when the " alumina or alum is all dissolved and mixed with the pulp," adding "20 lbs. of soap to every 100 lbs. of pulp." For some purposes it has been found "advantageous to add from 2 to " 2½ per cent. of pearl ash and antichlorine to the pulp." The above proportions may be altered, and "other substances " possessing the same or similar properties may be used."

[Printed, *4d.* No Drawings.]

1863.

A.D. 1863, January 1.—No. 1.

COLLYER, ROBERT HANHAM.—" Improvements in the method " of and apparatus for preparing materials for the manufacture " of paper and similar purposes, part of the invention being " also applicable to other operations in which materials are " subjected to the action of hot agents."

These improvements are, first, in preparing materials for the " above purpose, subjecting them to alternate showers of " hot water and alkaline solutions, and to the continuous action " of superheated steam or hot air or both." By "intermit- " tent showers of hot liquids used in combination with ascend- " ing currents of superheated steam or hot air, or both,"

" the materials being kept meanwhile in a state of motion " and separation."

Second, "the apparatus for treating the materials with liquid " showers and aeriform currents," consisting of a close horizontal or longitudinal receiver, through "which passes a hollow " or tubular horizontal axis, to which rotary motion may be " communicated; this axis turns in the ends of stationary " pipes, which lead from the hot water and alkaline liquor " tanks, and communicate with the interior of the axis, one at " each end." The axis " carries perforated hollow arms opening at one end into the interior of the axis, and closed at the " opposite end." "The main receiver has a perforated false " bottom under which is a perforated steam pipe or pipes. " Steam pipes communicate from the main receiver to the " alkaline liquor and hot water tanks, from which tanks the " showers of alkaline liquor and hot water are alternately " ejected through the axis and its arms on the materials in " the main receiver." "This apparatus is also applicable for " other operations in which materials are subjected to the " action of hot agents." The shaft may sometimes be solid, and the liquors supplied through pipes.

[Printed, 10*d*. Drawing.]

A.D. 1863, January 3.—No. 27.

ASTROP, William.—"Improvements in the manufacture of " paper."

These improvements are, "the employment of the fibrous " portions of the roots of parsnips, carrots, and turnips of all " kinds, and of the roots, stems, and stalks of beet, mangold " wurzel, chicory, and rhubarb plants, also of the fibre of the " cocoa-nut, and leaves of the orange plant, and flags or reeds, " also horse or cattle manure, for the manufacture of 'half " 'stuff' and pulp to be used in the production of paper and " cardboard, the substances or materials herein-before enumerated being employed either separately or in any combination with each other, or with any of the ordinary pulp " now used in the manufacture of paper and cardboard." " In preparing the roots, stem, stalks, and leaves of plants," they are first washed thoroughly, and any extraneous "matter " is cut off or otherwise removed, the juice is extracted by " pressure, and the solid matter or pulp boiled in alkali and "bleached in the ordinary well-known manner." In treating manures they are first freed from ammonia and then washed, "after which they are boiled in alkali and bleached in the "usual manner."

[Printed, *4d*. No Drawings.]

A.D. 1863, January 10.—No. 90.

FENTON, FERRAR.—"Improvements in the manufacture of "pulp for paper making and similar purposes."

These improvements are, in preparing exhausted tan, "tanners' waste, the bark of oak, alder, elm, lime (or "linden) willow and poplar trees into paper pulp or half "stuff for the manufacture of paper, cardboard, and papier "mâché." The materials are first washed, then crushed or ground, again well washed to remove the heavy and inferior portions unsuitable "for the higher classes of paper," the "separation being effected by well stirring the crushed "bark in a large vat of cold water, skimming off the woody "portions of bark which float on the surface, and allowing "the rest to settle, and the water being" drawn off by a syphon or tap, the upper portion is "reserved for superior "kinds of paper, and the lower set apart for coarser varieties." Or the bark is dried after the first washing and crushed thoroughly between rollers, sifted, boiled first with water for three hours, any which floats on the top being skimmed off; the water is then drawn off, and the boiler "filled with a wash of carbonate "of soda or carbonate of ammonia" in the proportion of 2 lbs. of either of the carbonates to each hundred gallons of water, and 100 gallons of such liquid to 1 cwt. of bark, and boiled for not less than one hour. The liquid is drawn, the pulp which is pressed "crushed in a common pulling mill or 'dolly,' "or by rollers," the former preferred, and soured by means of dilute sulphuric or muriatic acids, or by acetic acid and water, in preference hot; after about an hour the pulp, which is still unbleached, may either be dried and so sold, or "it may be "removed to a bleaching bath of chloride of lime, chlorine, "or chlorine gas." Or "the above-mentioned materials re-"duced to a pulp by any other means may be bleached by "the processes above described, and the pulp at once made "into paper." The acetic acid bath may be dispensed with.

[Printed, *4d*. No Drawings.]

A.D. 1863, January 13.—No. 110.

AMOS, Charles Edwards.—"Improvements in machinery "for the manufacture of paper."

These improvements relate "to that part of paper-making "machinery in which the knots, lumps, pieces of stick, "dirt, and other impurities or extraneous matters are removed or separated from the fine pulp of which the "paper is intended to be made," and they are "particularly "applicable to the knotters through which the pulp flows in "an upward direction, leaving the extraneous matters below "the straining or knotter plates," and are "also useful when "applied to vats applied with knotters, through which the "pulp passes from the outer to the inner side of the knotters, "and in which the knots and other extraneous matters have "hitherto been left in the vats." In carrying out the above, "the knots and other extraneous matters which accumulate "below the straining surface or knotter plates are drawn out "or removed by means of a pump or other analogous contrivance, and are conveyed into an ordinary knotter which is "to be used for the separation of such knots and extraneous "matters from the fine pulp which may be drawn out or removed "therewith. The fine pulp will then be allowed to flow back "into the other or first knotter beneath the knotter plates, "through which it will pass and be conducted into the paper "machine while the knots will remain on the top of the "knotter plate of the second or ordinary knotter, and may be "readily removed therefrom by means of a skimmer or slice. "By this arrangement of parts there will be but little necessity "for stopping the machinery in order to cleanse the knotters "and the work may therefore proceed uninterruptedly."

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1863, February 2.—No. 297.

FRITH, Richard Hastings.—(*Provisional protection only.*) —"Improvements in the manufacture of paper."

These improvements are, the reduction of peat or turf bog "into a pulp, which is then bleached by the application of "chloride of lime or by any other chemical bleaching process, and afterwards manufactured into paper in the ordinary manner."

[Printed, 4d. No Drawings.]

A.D. 1863, February 11.—No. 371.

DUCKWORTH, John.—" Improvements in the manufacture " of paper."

These improvements are, "the mixture or amalgamation " of the mineral substance generally known by the name of " 'doughing,' being a mineral found covering the seams of " certain mines of coal," which is " principally composed of " alumina, common clay, and shale, and is ground or pulped " in any suitable manner" with the fibrous pulp or half stuff used in the manufacture of paper, the said mixture or amalgamation to be used in any suitable proportion according to the quality of paper required. By this admixture the paper is made cheaper, of finer quality, and more susceptible of glaze than by the " ordinary modes employed, and also forms " various shades of color without the aid of other coloring " matters."

[Printed, 4*d*. No Drawings.]

A.D. 1863, February 14.—No. 408.

CLARK, William.—(*A communication from Azel Storrs Lyman.*)—" Improvements in the method of and apparatus for " separating the fibres of straw, wood, and other vegetable " substances and extracting the gummy and coloring matters " therefrom, to render them fit for paper stock or for other " purposes."

These improvements are, first, " making the macerating pro- " cess continuous by supplying and discharging the material " and the water necessary to effect maceration by means of a " continuous forced circulation through the boiler or macerat- " ing apparatus effected by a pump or its equivalent."

Second, " saving the heat of the discharging pulp or " macerated material by retaining it under pressure after it " has left the boiler or macerating apparatus, and passing the " increasing fibrous material and water in a contrary direction " to the discharge through a suitable system of pipes or " passages properly arranged in relation to the discharge " pipes or passages."

Third, " forcing the boiled material from the boiler through " a mill or other grinding or rubbing apparatus by the com- " bined or simultaneous action of the pump or its equivalent

" through which the circulation through the boiler is produced, " and of the pressure due to the heat of the steam or water in " the boiler."

Fourth, "the employment in the pump by which the circu- " lation through the boiler is produced of cutting valves," operating "so as to cut any straw or other material which may " be left in the valve passages when the valves close, and thus " ensure the perfect closing of the valves and prevent " leakage."

Fifth, "the employment for transferring the heat from the " discharging to the increasing material of twin or double " pipes."

[Printed, 1*s*. Drawing.]

A.D. 1863, February 16.—No. 415.

CROSSLEY, James William.—"Improvements in press " papers, and in the method or means of drying them and " other similar sheets of paper, applicable also for the drying " of woven fabrics, yarns, wool, cotton, or other fibrous sub- " stances."

These improvements are, first, "having press papers coated " or covered with tin foil or other metal in thin leaves or layers, " or an alloy of tin and any other suitable metal, or with other " alloys, mixtures, or amalgams capable of producing metallic " surfaces thereon."

Second, employing a series of cylinders heated by steam or other heating media, and two endless aprons or cloths which pass over or partly around and in contact therewith in such manner that press papers or other sheets of paper may be placed betwixt and carried or conducted thereby over and around or in near contact with each of the said cylinders in succession, by which they are dried; "these cylinders are " enclosed, the enclosure having a chimney or opening at the " top (which may be connected by a pipe to the boiler " chimney with openings at the bottom to admit air, which " may be first heated)."

[Printed, 8*d*. Drawing.]

A.D. 1863, February 20.—No. 467.

CLARK, William.—(*A communication from William Fittock Ladd and Samuel* Armstrong Walsh.)—" An im-

" provement in boilers for disintegrating and pulping vege-" table substances." The object of this invention is to ensure "the complete submergence of the substances in " the liquor or solution during the boiling process." " To " this end the boiler is made of an upright form, with a " man-hole and man-head at the top, and with a perforated " diaphragm or screen some distance below, such diaphragm " or screen having a man-hole in its centre corresponding " with the first-mentioned man-hole, and communicating " therewith by means of a perforated cylinder or well, " and fitted with another man-head." The heat may be either steam or the direct application of fire, "which may be " placed in a suitable car or travelling furnace," which can be " removed after the boiler has been subjected to its action for " a suitable length of time."

[Printed, 6*d*. Drawing.]

A.D. 1863, February 25.—No. 528.

GREEN, JOHN BARCHAM.—(*Provisional protection only.*)— " Improvements in the manufacture of paper."

These improvements are manufacturing paper "in such a " manner as to give increased strength to the edge of the " piece or sheet of paper by producing thereon an edge of " increased thickness or density," and for this purpose "the " wire mould on which the pulp is spread is formed with " certain portions of its surface in grooves or channels so " as to be capable of receiving a greater depth of pulp at such " portions."

[Printed, 4*d*. No Drawings.]

A.D. 1863, March 25.—No. 780.

STUART, GEORGE.—"Improvements in bleaching jute fibre."

These improvements are "the bleaching of jute fibre by " immersing it twice or oftener in a solution of a chloride, " each immersion being followed by an immersion in dilute " sulphuric acid." This process, it is said, is applicable to rags and paper pulp. The jute, if necessary, is washed with alkali, immersed in a solution of chloride of lime, which may be of 3° or 4° of Twaddells' hydrometer, for *from 6 to 8 hours* or more, then squeezed and washed in pure water and immersed in dilute sulphuric acid of about 6° for from 6 to 12 hours; the acid is then drained or squeezed out, and the material is washed in pure water and immersed a second time in a solution of chloride of lime, which may be a little weaker than that for the first immersion, say from 2½° to 3½°, and may remain in it for from 4 to 6 hours, and after draining or squeezing and washing as before, the material is immersed a second time in dilute sulphuric acid of about the same strength as before for from 3 to 4 hours, when it is drained or squeezed and washed. If the material is not then white enough, it is immersed a third time in a solution of chloride of lime marking 2° or 3°, or a little weaker than before, and proceeded with as above. It is stated "that the practical "bleacher or paper maker will understand that the strengths "of the solutions, and the durations of the steepings, may "require to be varied," with the nature of the material under operation.

[Printed, 4*d*. No Drawings.]

A.D. 1863, April 28.—No. 1064.

CLARK, WILLIAM.—(*A communication from John Franklin Jones.*)—"Improvements in machinery for the manufacture of "paper, and of the various kinds of boards produced from "fibrous substances."

These improvements are, first, arranging and combining two or more cylinder moulds and vats so "as to deliver "continuous webs of pulp one upon another, either for the "purpose of being pressed together to form board or of being "dried and calendered separately to form paper."

Second. Combining "such a system of cylinder moulds," and "a continuous series of drying cylinders and calendering "rolls."

Third. Arranging a cutter in combination with the above.

Fourth. Arranging "the several vats containing the cylinder "moulds and the several felts" so that the felts pass under the vats, "whereby a desirable length of felt is obtained, and "yet the vats are allowed to be brought very near each "other."

Fifth. Arranging several troughs or spouts connecting pipes and valves for the purpose of regulating the supply of pulp and water to the several machines, and carrying away the back water.

Sixth. The save-all.

Seventh. The combination of press rolls to obtain two pressures from three rolls.

Eighth. Employing calender rolls on the top of drying cylinders.

Ninth. Employing "in combination with machinery for pro- " ducing and finishing a continuous web of paper or board" a cutter or cutters, a flyer or lay-boy for taking away the sheets from the cutter, and a descending piling table.

Tenth. A cylinder mould.

This machinery is composed of a series of distinct paper-making machines, each of which is capable of producing a separate and distinct web of paper. The save-all vat is arranged behind the last of the series farthest from the stuff chest, and is a reticulated cylinder, having a suction pipe rotating in " the said vat, as also a coucher running directly in contact " with the said cylinder," and a scraper above it. In a framing erected over the series of machines are arranged two tiers of steam drying cylinders, the upper tier being arranged over the spaces between the lower ones; an endless apron runs under the lower series of drying cylinders, upon a system of carrying rolls. Calender rolls are arranged above the upper drying cylinders to operate in combination with them, and a calender roll operates with the last lower drying cylinder. Four pairs of calender rolls are arranged above the drying cylinders, and three pairs beyond the end of the series of drying cylinders. Above the upper calender rolls are arranged carrying rolls. At one end of the machine, arranged on the upper floor, are a system of second press rolls with a separate felt. The rolls are three instead of two, one above the other two. The cutting apparatus is composed of a stationary horizontal blade, and a vertically moving horizontal blade, which works in stationary guides in the framing. The paper or board is delivered by the rolls over the stationary blade and under the moving one. In front of the cutters is a horizontal frame " in which run a series of endless moving tapes or bands " which, receiving the sheets one at a time as they are cut " off, carry them forward on to the swinging flyer or lay-boy," which deposits them upon the piling table, which descends a distance equal to the thickness of one sheet every time a sheet has been placed upon it. This is effected by means of two upright screws of similar pitch attached to its under side, and passing through nuts secured firmly in the hubs of two spur wheels of similar size, which are geared together by an intermediate wheel, &c. In constructing the cylinder moulds they have a hollow journal for a suction pipe, and with an inner concentric hub attached only by diagonal or oblique arms or braces for the reception of one end of the shaft, &c.

[Printed, 1*s.* 4*d.* Drawing.]

A.D. 1863, May 7.—No. 1138.

PARK, James.—"Improvements in communicating motion to
" machinery for manufacturing paper pulp."

These improvements are " communicating motion to two or
" more rag engines from one steam engine, supported by the
" troughs of the rag engines." " The axles of the drums of
" the two rag engines are connected by means of a link,
" jointed to the crank pins, projecting from the fly wheels,
" to one of which crank pins the connecting rod of the
" steam engine is jointed, and this crank pin may be con-
" nected by a rod to the crank pin of another rag engine;
" or the motion may be communicated to one or more rag
" engines by means of straps passing over the fly wheels,
" or by toothed gearing."

[Printed, 1*s.* 2*d.* Drawings.]

A.D. 1863, May 9.—No. 1163.

GEDGE, William Edward.—(*A communication from Lucien Bardoux.*)—"Improvements in the manufacture of paper stuff
" or pulp from certain vegetable substances."

These improvements are manufacturing "pulp or stuff
" for making paper, cardboard, and plastic for modelling
" and ornamental purposes, sometimes termed paper maché,"
from "leeks, cabages, and apples; asparagus, the leaves,
" stalks, and shells of peas, and skin of split peas; from
" the leaves, stalks, and shells of haricot or kidney beans;
" the leaves, stalks, and skin of potatoes and of beetroot;
" from garlic, from the bran of cereals, from cherries,
" from the green sprigs of the vine, from the leaves of

" of the vine, from the grape stalk stripped of its fruit, from " the dried sprigs of the vine, from small bundles of vine " branches, from the yellow water flag, from the hemorocallis " or day lily, from straw, from meadow and other hay, from " fern, from the leaves of the oak, from the leaves of the " Dutch poplar, from the leaves of the plane tree, from the " leaves of the common poplar, and from elm and other leaves, " from old cordage, and from old dishclouts or dusters for " white paper; from old carpet brooms, or their shreds and " their osier twigs; from the wood of the chestnut, the oak, " the walnut, the ash, the elm, the beech, the alder, the fir, " the poplar, and the willow, and also from hempen, flaxen, " and cotton rags reduced to dust." In preparing "the dust " from cotton, hempen, and flaxen rags and their plastics," the rags are cut into pieces about the size of a quarter of an inch, damped, and pressed, gradually letting fall upon the heap sulphuric acid at 53°, triturating, and adding more acid until the heap acquires consistence, when it is allowed to remain 24 hours, and is then steeped in water, and removed to successive baths of water until the water shows no trace of acid, pressed, broken into small pieces, placed in a vase, and bleached by pouring "chloride of potash upon it;" the inventor then triturates the whole, pours off the water several times, and presses the material. With leeks, the entire leek even to the roots, may be cut into pieces, boiled for one or two hours, stamped, "after the method usually employed by " paper makers," then the pulp is washed and the paper made in the ordinary manner. Or the pulp has added to it chloride of lime previously crushed or ground to avoid clots or lumps; "triturate the whole and allow it to remain not " more than half an hour at most in the chloride of lime, " eking out water to the material." Pour off the water in " twice, press the pulp, and submit it a second time to " the operation of chloride of lime, which is left with " the well triturated matter during another half hour, always " avoiding in this operation the obtaining of the white colour, " as in that case the pulp is burnt, and is only good for plastic; " the pulp is then washed with two or three waters, pressed " dry, broken into small pieces; chloride of potash is poured " upon it, and it is triturated." Allow "the whole to rest for " two hours, and after this operation wash in four or five

" waters until the water from the pulp is not foul, and then " proceed to manufacture paper in the usual manner." Sometimes using a weak dose of chloride of lime, in the proportion of one quarter the weight of the matter. Or the pulp is treated only once with chloride of lime, and having steeped it in a little water, pour upon it sulphuric acid, first diluted with five parts water; the lime being destroyed, wash until the water retains no taste of acid, then use for paper making. A number of other methods are given for treating the pulp, modifications of the above. The cotton dust is mixed with the leek in various proportions. Processes are given similar to the above for treating various portions of the different substances named above, and also the substances themselves entire, and likewise modifications of these processes. It will also be advantageous to fumigate with sulphur certain pulps. And pulps may be composed of mixtures of these different substances. Besides the above-named substances are artichoke, dung of horse, ass, or mule; hay, maize, stalks, and leaves; thistles, rushes of field, meadow, or river. In some cases to make plastic from some pulp, adding lime in paste and then paste made from flour. To make plastic from woodland hay it is stamped, washed, and " this plastic being of a very " binding nature may be used without size." Plastic from apples is made as follows, "take the pulp of boiled apples, " treated with a stronger dose of chloride of lime than is " required for ordinary bleaching," and the day after "draw " off the water, press, and add a little flour paste."

[Printed, 1*s*. No Drawings.]

A.D. 1863, May 9.—No. 1167.

BOALER, William.—" An improved dryer fabric for paper " making."

This cloth is woven as follows, employing "two or more " warps drawn from one or more beams, according to thick- " ness of cloth required, which may be produced any thick- " ness either by using thicker yarn or more warps. The " warp threads are drawn through the healds in such a " manner as to produce at every change of the tappet or other " equivalent a shed through which the shuttle passes a thread " of weft, and after the requisite number of changes (which

" may be varied) have been repeated as often as required a " soft spongy porous cloth is produced." In carrying out the above "an ordinary loom of any required width, to which " is attached a positive or other taking-up motion for conveying away the cloth as it is woven," is employed. " Behind the loom is a frame, in which are placed one or more " beams for holding the warp. The loom is so arranged that " any number of shafts or healds may be employed as is " requisite for the production of this fabric. The healds can " be worked with either tappet, index, chain, or jacquard " machine as may be thought proper or most convenient."

[Printed, 6*d*. Drawing.]

A.D. 1863, May 13.—No. 1206.

LAMBERT, Benjamin.— "Improvements in paper makers' " rag or pulp engines."

These improvements are, first, constructing the above engines " with a hollow partition which is fixed on the " flow side of the engine ; this partition is composed of finely " perforated sheet metal or wire gauze ;" the water passing into the hollow partition may be drawn off therefrom by a cock, and "the speed at which the water is allowed to flow off " may be readily regulated by the cock." "If desired, the " side of the midfeather and the side of the engine and other " parts of the engine may, as heretofore, be formed with " perforated metal or wire gauze or other suitable material, " so as to strain off the water at such parts in addition to the " partition."

Second, in constructing the above engines preventing " the " beating rollers drawing air into the covered chambers " by using a roller having radial floats or projections, and communicating motion from the axis of the beating roller or otherwise to such roller in order that the floats "may be " caused to dip into the stuff, and thus not to prevent the " free flow of the stuff;" a flexible curtain, in preference, of vulcanized rubber is over the top, " against which one or more " of the floats or projections are constantly in contact, so as to " prevent air passing into the chamber within which the " beating roller works." The other arrangements for heating, &c. may be as heretofore.

[Printed, 10*d*. Drawing.]

A.D. 1863, May 28.—No. 1342.

RICHARDSON, THOMAS, and IRVINE, ROBERT.—"Improvements in treating the waste liquor obtained in the "preparation of esparto grass."

These improvements are, first boiling down the waste liquor obtained in the usual mode of preparing esparto grass with carbonate of lime or magnesia or any metallic oxide to dryness. These substances are added in equivalent quantities, and the residue is balled "as practised "in alkali works." Second, "lixiviating the black balls, "obtained as above described, in the usual way, and em-"ploying the resulting liquor for treating fresh quantities of "esparto grass in lieu of using fresh alkali."

[Printed, 4*d*. No Drawings.]

A.D. 1863, June 5.—No. 1403.

GRAY, THOMAS.—"Improvements in treating flax, hemp, "and other vegetable fibrous substances in order to bleach "and separate the fibres."

These improvements are, the fibrous substances are first washed in water, "then placed in a weak bleaching "liquor composed by preference of from 4 to 6 ounces of "chloride of lime to 1 gallon of water," for from 6 to 12 hours according to the nature of the fibre, when they are again washed and "boiled in a solution of soda ash or "other suitable alkali for from 2 to 4 hours, employing by "preference about 1 oz. of ash to a gallon of water. If the "fibres are very stout and harsh they may, before being "boiled in the alkaline solution, be first laid in a weak "solution of sulphuric acid," ($\frac{1}{2}$ oz. of sulphuric acid to about 1 gallon of water), and be afterwards laid to drain before being boiled. "After boiling in the alkaline solution they are "again washed, and are then placed in a bleaching liquor "(which may be either cold or warm) mixed with a solution "of soda ash or other suitable alkali" for from 4 to 6 hours. "The mixture is composed, in preference, of from 4 to 6 oz. "chloride of lime, 1 oz. soda ash, and 1 gallon water." The fibres are then washed, and if for use "in the manufacture of "paper, they are subjected to the action of a paper, rag, or "*pulping engine.*"

[Printed, 4d. No Drawings.]

A.D. 1863, June 20.—No. 1559.

CLARK, William.—(*A communication from Louis Alexandre Joseph Deplanque.*)—"Improvements in the treat-" ment of broom for the manufacture of paper pulp."

These improvements are, first, "the application of the prin-" ciple of garden hot-beds to the retting of broom with or " without the addition of quicklime."

Second, "the method of separating the fibre from the " ligneous part of broom." "When the retting is considered " sufficient, the plants are removed from the trench and then " washed in plenty of water and allowed to dry, after which " they are beaten either by hand with a stick or flail, or by " mechanical means. This being complete, the materials are " ready to be stripped either by hand or by ordinary mecha-" nical means, in order to separate the fibre from the ligneous " part, these two matters being treated separately."

Third, crushing the "ligneous part by means of stampers or " other mechanical equivalent without breaking the fibre."

Fourth, "the method of bleaching by the application of " solutions of chlorides of potash and soda to the fibre and " ligneous part of the matters under treatment."

[Printed, 4*d*. No Drawings.]

A.D. 1863, June 23.—No. 1587.

FEICHTINGER, Franz.—(*Provisional protection only.*)— " Improvements in the manufacture of paper applicable for " hemorrhoidal complaints."

These improvements are, "clean and pure pulp is combined " with the following ingredients, willow bark, china bark, " and gall nuts." "These ingredients are boiled in soft water, " the extract is separated by filtration through an ordinary " bag filter or otherwise. The extract is mixed with paper " makers' pulp, and paper is made therefrom in the ordinary " manner."

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 3.—No. 1652.

MARTIN, Charles.—(*Provisional protection only.*)—"Im-" provements in the treatment and preparation of materials " for the manufacture of paper."

These improvements are separating "the vegetable from "the animal fibre or substance in mixed fabrics" as follows :—The rags of the mixed fabrics are cut into pieces, and boiled with water and lime, in preference the lime "being about 10 pounds to every 112 pounds of rags. The "animal fibre having been thus dissolved is removed by washing" by "fulling stocks, or other analogous apparatus." The rags are again boiled in water, to which has been added "about 6 pounds of lime and 10 pounds of alkali to every 112 "pounds of rags," and again washed and steeped in a bath "of a solution of chloride of lime or chloride of soda, to which "a small proportion of sulphuric acid is added" and heat applied. In a suitable time the rags are removed and the acid washed out by a current of water. "The rags are then steeped "in a finishing or sour bath formed by adding a mixture of "cream of tartar and sulphuric acid in the proportion of 1 part "thereof to about 32 parts of water," heat being applied. The rags are removed from the last-mentioned bath and "finished by being washed in a dash wheel or by any other "suitable means."

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 16.—No. 1789.

LAMBERT, BENJAMIN.—"Improvements in the preparation "of waste paper in order to its being again used in the manufacture of paper."

These improvements are, after the waste paper is passed through a duster, "softened by hot water or by steam, and "then broken into half stuff in the ordinary rag engine" and washed, "the half stuff is first boiled in an alkaline ley either "under pressure or otherwise (caustic by preference, and of a "spec. grav. say of 1·004 water being 1000) for about four "hours." "If necessary, the half stuff is then macerated for "about twelve hours in the alkaline liquor, and then drained "and washed in an ordinary rag engine, or if boiled in a rag "engine the half stuff should be beat in the liquid during "the boiling. In the case of very rough stuff with an admixture of coarse straw, it may be desirable to boil under "high pressure for the purpose of reducing any siliceous "*matter*." The half stuff after washing is "next steeped in "*an acid bath*," sulphuric or oxalic acid preferred, "if the

" former acid be used then at a spec. grav. of about 1·001, " and if the latter acid be employed then at a spec. grav. of " about 1·001·2;" most of the acid is then separated conveniently by pressure, some acid remaining "to aid in the " process of bleaching. The half stuff, when ready, is " next steeped in a solution of the best commercial chloride " of lime sp. gr. of about 1·002·5, where it is allowed to " remain until the proper color is obtained. After bleaching the half stuff is removed in the ordinary way either into " an intermediate or a beating engine direct, and prepared for " the paper machine."

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 21.—No. 1821.

ROECKNER, CARL HEINRICH.—"Improvements in machinery and process for reducing wood to a fibrous condition " for the manufacture of paper stuff or pulp."

These improvements are, first, "a cylinder or cylinders " mounted in suitable bearings, and having the external " surfaces cut or pointed somewhat similar to that of a rasp or " file, or sawteeth, or a number of curved rasps or files fixed " so as to rotate about the central axis."

Second, "a number of circular saws either in one piece or in " segments, fitted together and placed side by side so as to " form a cylindrical or segmental cutter rotating or moving " upon an axis so formed and mounted as to have a reciprocating motion." In order to have a very fine fibre the teeth of these circular saws or segments are formed "in an entirely " new manner, so that each tooth terminates in a point like a " needle or knife, being so fixed upon a cylinder as to touch " the wood in as many different points as possible."

[Printed, 10*d*. Drawing.]

A.D. 1863, July 31.—No. 1899.

ARROTT, ALEXANDER ROBERTSON. — "Improvements in " bleaching certain vegetable fibres used for textile or other " purposes, whether in the raw state or manufactured."

These improvements are for the "bleaching of flax, hemp, " jute, cotton, or other vegetable material used as a textile *material* or for the manufacture of paper;" they are as follows :—A solution is prepared of a chloride of an alkali containing a certain amount of free caustic alkali at least in proportion to the amount of chlorine in the solution as 5 to 100 ; the proportion of caustic alkali when bleaching jute may with advantage be increased "to the extent of 25 to " 100, and in any case the amount of caustic alkali in " the solution may be such as would not affect the strength " of the material." "The strength of the bleaching " liquid will vary with the nature of the material to be " bleached, and the temperature at which the process is carried " on, high temperatures requiring weaker liquids." The " temperature preferred is 80° to 100° of F.," and the liquid preferred "at this temperature contains 200 to 300 grains of " chlorine per gallon." "There are many methods of prepar- " ing the bleaching liquid, one of the most convenient is by " passing chlorine into a solution of caustic alkali" in quantity so as to leave the required amount of free caustic alkali. " Or bleaching powder may be decomposed by means of car- " bonate of soda or of potash, a quantity of this being added " beyond the amount required to decompose the chloride of " lime present in the bleaching powder ; the free lime, which " is always present to some extent in the bleaching powder," converts this excess of carbonate into caustic, but if there is not enough of caustic lime in the bleaching powder more must be added.

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 1.—No. 2164.

EWENS, GEORGE WHIFFEN.—"Improvements in the manu- " facture of wadding, paper, and felted fabrics, and in the " preparation of vegetable fibres to be used in such manufac- " tures."

These improvements are, first, "the application of the fibres " of the plants known as percursa, and other plants of the " family enteromorpha, also the fibres of the plants known as " rivalaris, and other plants of the family conferva" in the above manufacture.

Second, the preparation of these and other vegetable fibres, to render them suitable for such manufacture :— From March to November the above plants growing "in all

" shallow streams, stagnant pools, marshes, bogs, swamps, " and more particularly in lagunes or mud banks flooded by " the tide, and which are found more or less on all coasts," are "collected, dried, and preserved by stacking it in the same " manner as hay." In preparing these plants for paper making the material can be prepared by the usual machinery. When these plants are to be used for the other above-mentioned purposes, in preference, a number of sunken pits, each to hold about 1,000 gallons, are employed for the purpose of transfering the material from one to the other; 600 gallons of water and 1 bushel of ground quicklime are well stirred together, and 5 cwt. of the material to be treated is added and allowed to remain 48 hours, but if urine can be obtained 20 gallons are added, and with this addition 24 hours will be sufficient. The mass is then treated in the next pit with a stream of cold water, and when washed it is treated with the usual quantity of water and ½ cwt. of chloride of lime or other bleaching agent from 6 to 10 hours, drained, rinsed, put into another pit with a solution of soap and soda or other alkali, 10 lbs. of each, drained, soaked in strong solution of sea water, pressed, dried, &c. The prepared fibre is reduced to pulp, when made into paper by the ordinary means.

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 5.—No. 2189.

MILLBOURN, Samuel.—(*Provisional protection only.*)— " Improvements in the preparation of materials for the manu- " facture of paper, and in the construction of machinery " employed for such purposes."

These improvements are, "a receptacle in the form of an " inverted cone, the same being constructed of metal or " other material suitable for the purpose, another inverted " cone being mounted on a vertical axis and placed within " the said receptacle. The opposing surfaces of the cones are grooved or "corrugated." The materials as "half " stuff" are introduced at the upper part of the conical receptacle, the internal cone is caused to revolve by any suitable motive power, the "half stuff" by its gravity descends "to " the lower part of the external conical receptacle, and having " in its descent between the grooved corrugated surfaces of

" the cones been reduced to a fine pulp, escapes by means " of an exit provided for that purpose at the bottom," fit for the paper maker.

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 5.—No. 2194.

BATT, Richard.—"Improvements in paper-making machinery."

These improvements are, "the use of the following particular " arrangements, by virtue of which the Fourdrinier wire is " made to work effectually with what is called the American " cylinder." "The pulp is received from the vat upon the " endless web of wire of the Fourdrinier machine. At the " end of this wire furthest from the vat is the moulding " cylinder," made partly of wood or metal, and of wire or openwork grooved or perforated to allow the water from the pulp to pass away as the pulp is here couched. "To accomplish this a roll softened by loose woollen lappings is " placed above the cylinder, round which and between it and " the cylinder are endless felt (the only one used) runs, and " conveys the pulp upon its surface in an upward direction " to be pressed by passing between a metal or other bowl " and a heated cylinder, which subsequently dries it into " paper," "The pulp is thus conveyed in one unbroken web " from the vat to the drying cylinder, the felt being carried " on (as in ordinary machines) to a convenient point of the " framing, and provided with washers and squeeze rolls to " cleanse it after having delivered the pulp to the drying " cylinder," heated with steam into its interior, and not requiring fitting. "The ordinary couch jacketting is dis" pensed with as the ordinary couch rolls are not used."

[Printed, 8*d*. Drawing.]

A.D. 1863, September 10.—No. 2232.

WRIGHT, Holmes, WRIGHT, John William, and CLOUGH, William.—"Improvements in glazing and rolling press papers, " pasteboard, and other paper requiring to be glazed or " rolled, and in the means or apparatus employed therein."

These improvements consist "in having the glazer or roller" *(which is a substitute* for the pole hitherto used) "made in the

" form of a section of a circle or sector, or a part of a wheel, " including the centre or boss in which the bowl is placed. The " middle part of the rim or circular surface is provided with " teeth or cogs, leaving a plain part on each side thereof at the " radius of the pitch line of the cogs. A suitable framework " having a projecting arm or jib is also provided, on the underside of which are corresponding plain parts and cogs forming " a straight horizontal rack, in the cogs of which the cogs of " the sector can work, and on the plain surfaces of which the " plain parts of the rim of the glazer or roller can roll." " The bed or table is made straight, and not curved nor " hinged, but rests horizontally upon a pair of levers or a " combination of levers, which are actuated by a treadle in " the usual manner for applying pressure. The glazer or " roller is actuated by a crank or stud wheel having rotatory " motion which is connected with the boss of the glazer or " roller by a rod. The glazer or roller is supported or held " up in gear with the rack or in near position for action by " friction rollers attached thereto, and capable of resting or " running upon two projecting arms or flanges of the framing, " or other suitable means may be employed for this purpose."

[Printed, 8*d*. Drawing.]

A.D. 1863, September 17.—No. 2287.

McLAURIN, PETER. — " Improvements in drying paper, " pasteboard, and similar fabrics, and in the machinery, " apparatus, or means employed therein."

The general arrangement of machinery is as follows :—A belt driven by a contiguous prime mover gives motion to a horizontal shaft arranged near the floor of the drying room, and parallel to the sides of the drying apparatus. This main shaft has keyed to each of its extremities a bevil wheel, and the one at the front end of the machine gears with a bevil wheel on a short vertical shaft which carries at its upper end a bevil pinion that gears with a corresponding wheel carried on the end of a horizontal shaft extending across the front part of the machine. This shaft is arranged at the outward extremity of the framing which carries the whole of the apparatus, and it has fitted to it a drum round which is passed the first of a series of endless travelling belts that serve to carry the sheets of pasteboard through the machine. The first belt extends upwards in an angular direction, passing over a guide roller, and then extends in a horizontal direction to the back part of the machine, where it passes round an adjustable drum; the said belt then stretches towards the front of the machine, where it passes over a second guide roller parallel to the upper one, and thence down to the drum first referred to. A second endless travelling belt is arranged below the first one; below this is a third one, and more may be added if required. These endless belts each pass round a pair of drums or cylinders arranged one at the front and the other at the back part of the machine, the shafts of the drums being carried in brackets bolted to the framing. The brackets at the backward end of the machine are made "with horizontal slots, so that the bearings "of the drum shafts may be traversed to and fro by means of "a screw passing through the end of the bracket and actuated "by a hand wheel outside the bracket." The "belts are "driven from the bevel wheels on the backward end of the "main driving shaft which gives motion to a corresponding "wheel keyed on a vertical shaft arranged at the side of the "machine, and opposite the ends of the drum shafts. This "shaft has fitted to it bevel pinions which give motion to the "corresponding wheels on the ends of the drum shafts. "Besides the endless belts before referred to there is a supplementary belt arranged at each end of the machine which "serves to transfer the pasteboard from one belt to another "as it passes through the machine. Each of these supplementary belts is carried round a drum arranged opposite "the end drum of each travelling belt, and around guide "rollers fitted between the upper and under surfaces of the "travelling belts. These belts derive their motion from "frictional contact with the travelling belts that carry the "pasteboard through the machine. When the machine is in "operation the pasteboard is carried along the first travelling "belt to the back of the machine, where it passes in between "the first belt and the end supplementary belt, by which it "is carried on to the belt below, the exposed sides of the "pasteboard being reversed in the turning. The pasteboard "travels along the second belt to the front of the machine, "where it is conveyed by the supplementary belt on to the "third travelling belt, after passing along which it is con-

"ducted on to a fourth belt, and then emerges from the "machine. In its passage along these belts the pasteboard "is exposed to the action of heated air, which is admitted in "any convenient manner from the lower part of the room." "In drying heavy pasteboard or millboard, or similar fabrics, "the herein-before described arrangements can be modified "in so far as refers to the time allowed for the drying action. "In place of an endless band running throughout the machine, each line or tier may be arranged to work by itself, "provision being made for setting one or other in motion at "pleasure." In such case when one tier of belting "or carrying surface is supplied with material to be dried, it can be "stopped in its traverse, and kept at rest until the material "is dried. The next tier is then supplied, and so on throughout the series. For the supply of the material to the drying "tiers a platform capable of being raised and lowered by a "rack and pinion, or by other mechanical means, is arranged "on the feeding side of the machine, so that any tier can be "attended to at pleasure. A similar arrangement is made at "the delivery end of the machine for the purpose of receiving "the dried sheets at any level."

Several modes of carrying out this invention are described, and the general arrangement and construction of machinery, apparatus, or means are claimed, together with the application of closed heated chambers to the same.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1863, October 2.—No. 2418.

LUNDY, John James, and IRVINE, Robert.—(*Provisional protection only.*)—"Improvements in the manufacture of "paper."

These improvements are, applying and using silicates of magnesia known commercially "under the names of talc and steatites or soap-stones." "These materials, after being finely "powdered or livigated with water, are used in the manufacture of paper in suitable proportions;" also applying and using silicates of lime or combining "two or more substances "which will produce these silicates, and serve to retain them "in the paper when mixed with the pulp during the process "of manufacture." Or "the silicate of lime, or the silicate

" of magnesia, or the two combined, may be used in a state of " combination, being previously mixed with farina, starch, or " with the size used in paper making. Or in lieu of this combination the silicates may be mixed prior to being used with " finely powdered alabaster or gypsum, and known commer- " cially as 'mineral white,' 'pearl white,' 'terra alba,' or with " 'pearl hardening,' to produce the desired result." Besides the silicates of magnesia and lime using "analogous silicates, " such as asbestos, greenstone, hornblende, mica, serpentine, " or other similar substances after powdering or livigation," mixed or unmixed with the above substances, "or before or " after being purified or bleached where necessary to be decolorised by any of the processes now in use for purifying or " bleaching of barytes or other similar substances."

[Printed, 4*d*. No Drawings.]

A.D. 1863, October 13.—No. 2509.

PLACE, Joseph.—"An improved application of certain schistous or shaly materials to the manufacture and finishing of " paper."

This invention is as follows:—In place of applying the soft mineral known as "doughing," which has been applied to the same purpose, applying "'alum shale' or 'alum schist' " termed 'white shale,' steatite, called 'soapstone,' all of " which are hard, and some being procured more cheaply, " and all producing better results than the soft minerals called " doughing, which is sometimes called incorrectly shale, being " of a grey or slaty colour." These materials, prepared by grinding or pulverizing, are "mixed with the paper pulp " during manufacture either in powder or paste; it may be " applied to the surface after the paper is made, and they " may be employed either in their natural color or bleached, " or artificially colored or tinted." "The white clay called " 'white earth' is also applicable for this purpose."

[Printed, 4*d*. No Drawings.]

A.D. 1863, October 14.—No. 2520.

RIDEOUT, William Jackson.—"Improvements in boiling " rags and other paper-making materials."

These improvements are, "when using solutions of alkalies " *or alkaline* earths," boiling rags by means of steam,

" whether superheated or ordinary steam separate from the " solutions employed," " either by a rotating or a fixed " boiler surrounded or enclosed in a steam jacket similar to " what has before been used for other heating and boiling " purposes. By this means the desired strength of solu- " tion will be insured during the boiling of rags and other " paper-making materials." "There are some paper-making " materials which are too tender to bear the rotation of the " apparatus during the boiling, such, for example, as esparto " and straw" for such materials is employed, "a similar " apparatus either kept stationary during the process or not " made so as to be able to rotate."

[Printed, 8*d*. Drawing.]

A.D. 1863, October 21.—No. 2587.

BROOMAN, Richard Archibald.—(*A communication from Pierre Celestin Victor Baud and Theodore Cassimir Delamarre.*)—" Improvements in treating ligneous substances, in " separating and recovering the fibrous portions therefrom, in " preparing, bleaching, and sizing the same, and in machinery " employed therein."

These improvements are, "by a combined series of me- " chanical and chemical means," extracting from "ligneous " plants, particularly the broom, their fibrous parts, free these " parts from coloring and clogging matters, soften and deco- " lorize them in such manner" as to fit them for "the uses of " textile substances and particularly to the manufacture of " paper." The substance in its green state, or if otherwise, restored as far as may be by soaking in water, is passed through a machine consisting of a pair of rolls driven at different speeds, in front of which there is a fluted feed roller," "a table or " apron first delivers the substance to the feed rollers." On issuing from the rolls it is delivered by an inclined shoot " between a drum and a semi-cylindrical concave plate." The drum is made to rotate, and at the same time to move to and fro in the direction of its length, while showers of water or other liquid are delivered between the drum and plate. The ligneous substance thus divested of resinous and clogging matter is next transferred "to a beating and washing machine " consisting of a cylinder placed horizontally and flattened at

" bottom, in which a shaft carrying beaters is made to revolve " at intervals; inside the cylinder are projections, which the " beaters nearly or quite touch." The materials are introduced by a door in the top. Water is introduced into the cylinder and flows out through a trap and through a sieve. " In order to complete the softening and discolorizing of the " fibrous matter," it is submitted "to successive and alternate " actions of a solution of ammonia and of sulphurous acid. " These two agents are poured successively into the beating " and washing machine," and the material is afterwards " exposed in thin layers to the air. The sulphite of ammonia " can only pass into the state of sulphate of ammonia by " absorbing oxygen from the matter, and in proportion to the " quantity absorbed so will the matter be decolorized. The " matter may now be bleached by the processes followed in " bleaching textile substances," but it is said a superior effect is produced "by a novel combination of these means," as follows :—Using a solution of acetate of potash to keep the fibrous matter in suspension, which is subjected to hypochlorite of lime, and terminating "the operation by the addition of liquid " sulphurous acid to the bath." "The proportion of sulphu- " rous acid to be added depends upon the degree of bleach " required." The fibrous matter is now ready for sale, "but " as far as relates to its use, especially as pulp for paper," it is said a new method of sizing is employed as follows :—"The " most accessible organic matters in which fibrin exists, such " as muscular flesh, blood, and gluten of cereals," are chosen and digested for say 24 hours at from about 65° to 85° F. in a solution of hydrochloric acid, and the clear solution, treated with an alkali, precipitates the fibrinous matter, which is washed in clear water, and "dissolved in milk of lime under a low " temperature" is "mixed with the pulp in the ordinary man- " ner of sizing with vegetable size." "On the paper passing " between the heated rolls in the paper machine the heat " coagulates the albuminous matter and imparts adherence to " the fibres used in preparing the pulp."

[Printed, 8*d*. Drawing.]

A.D. 1863, October 22.—No. 2606.

BURDON, William Wharton.—"Improvements in reducing " *and preparing* wood for the manufacture of paper and pulp."

These improvements are, taking wood reduced "to pieces of "such size as will enter between the faces of revolving stones," and passing them through such stones, together "with a stream "of water, a solution of sulphuret of calcium or caustic potash "or caustic soda, or oil or solution of soft soap, or other suitable liquid, kept running through between the stones," or the wood is introduced dry. In some cases using "mills conical "or flat, with the grinding surfaces of steel or stone." When conical, causing "the solid cones to be rifled in large or small grooves, and when flat the two surfaces to be channelled or "rifled," and passing water or the above solutions at the same time as the wood between the grinding surfaces," and "next "boil the fibre resulting from the grinding, partially bleach "it, and pass it through a paper-maker's beater or other "similar machine, and expose it to the sun for some days," "sprinkle it with a solution of hyposulphite of soda, and "repeating the beating. The material is then fit for the "manufacture of paper, and of pulp for other purposes."

[Printed, 4*d*. No Drawings.]

A.D. 1863, October 30.—No. 2694.

BUSBRIDGE, George Frederick.—"Improvements in apparatus for feeding sheets of sized or unsized paper to a "drying machine."

These improvements are, "combining endless tapes or "bands so as to convey separate sheets of paper from several "separate places to a drying machine," as follows:—"The "sheets of paper are first laid on to endless tapes or bands "that conduct them to the tapes or bands of the drying "machine, there being three or more sets of bands, according "as the machine is made to take three or more sheets of paper "side by side. At the point where the sheets of paper are "delivered to the tapes or bands of the drying machine, the "sets of tapes or bands all pass around one common roller, "and continuous motion is given to all the bands from this "roller. At the points where the sheets of paper are laid on "to endless bands, each set of bands passes around a separate "roller; the central sets of tapes or bands are made longer "than the outer sets, in order that the central sets of bands "may protrude beyond the outer sets, by which means the

" attendants who are to supply the central bands with sheets " of paper may stand at the side of the endless bands and " will not be in the way of the attendants who are to feed the " other set of bands."

[Printed, 10*d*. Drawings.]

A.D. 1863, October 31.—No. 2700.

TASKER, William, the younger.—"Improvements in the " making of safety paper, and in the machinery or apparatus " employed therein."

These improvements are, first, "the general construction, " arrangement, and combination of machinery."

Second, "the application and use to, and in the manufacture " of, safety paper of a series of carriages or 'vehicula' pro- " vided with rising and falling trillises and matrices, the whole " being made to travel along and over suitable guides."

Third, "the imparting of a vibratory motion to the carriages " or 'vehicula' during their circuit."

Fourth, "the application of flat-sided drums or cylinders " for carrying and transmitting motions to the series of " carriages or vehicula."

Fifth, "the combination with a series of carriages or " 'vehicula' and their trellises and matrices," of an "ad- " justable duplicate cylinder."

Sixth, an "arrangement of roller guides for elevating the " trellises and matrices during the circuit of the 'vehicula,' " and for maintaining the same at the desired elevation."

Seventh, "the application and use of inclined or flexible " guards for covering the intervening spaces between the " several carriages or vehicula."

Eighth, "the mode of regulating the rise and fall of the " trellises and matrices in the carriages or vehicula."

Ninth, "washing and rinsing the matrices in the series of " carriages or 'vehicula.'"

Tenth, combining "the couching roller and guide couch " rollers and endless felt with the series of carriages or " 'vehicula.'"

Eleventh, "couching of separate sheets of water-marked " *paper* upon the endless felt on the surface of a couching " *roller.*"

Twelfth, manufacturing "continuous lengths or webs of "water-mark paper by the use of an endless wove wire, so "constructed as to give the desired water-mark in combination with the duplicate cylinder."

Thirteenth, "preparing or constructing matrices for the "production of safety paper."

Fourteenth, "uniting together, upon the endless felt on a "couching roller, two sheets of safety paper of the same or "different colors and water-marks."

Fifteenth, "producing water-marks in safety paper by the "use of adjustable or moveable signs, figures, numbers, or "letters carried by the duplicate cylinder."

Sixteenth, "the application and use to and in machinery for "manufacturing safety paper of a self-acting counter or "indicator."

Seventeenth, "the application and use to and in machinery "for manufacturing safety paper of a pulp meter."

Eighteenth, "the manufacture of continuous water-mark "paper on an endless web of embossed wove wire, parts of "which are non-porous and work in contact, or nearly so, with "revolving rollers, whereby facility is afforded for separating "or dividing the continuous sheet or web of water-marked "paper into separate sheets either before and after it has been "dried."

Nineteenth, employing endless wove wire, or "separate "pieces of wove wire, of two or more blank planes of any "shape or contour, such planes being intended to produce "corresponding blank-shaped thickness of paper into which "water-marks are impressed by the duplicate cylinder."

Twentieth, "embossing, pressing, or stamping of endless "lengths or webs of wove wire by the aid of raised or engraved "surfaces."

[Printed, 2*s*. Drawings.]

A.D. 1863, November 7.—No. 2767.

BATT, Richard.—(*Provisional protection only.*)—"Improved arrangements of paper-making machinery."

This invention consists in using "the Fourdrinier wire frame, "with its endless web of wire," and using "either the couch "rolls as ordinarily constructed, or any other suitable pair

" of rollers of wood or of metal, and either plain, or grooved " or furrowed. The aforesaid endless web of wire can be " driven by the under of this pair of rolls, as in ordinary " manner, but the upper roll can be so disposed and applied " that it may be pressed against the under roll at any angle " that may be required, or against the endless web of wire " only, without pressing against the under roll at all." Indeed, "the upper roll may be placed at any convenient " position on the wire beyond the suction box." In pre- " ference, the web felt is carried round the upper of this " pair of rolls, whereby a long endless web of thin felting, " instead of the usual thick jacketting, is interposed be- " tween the roll and web of pulp. The pulp adhering to " the felt, in preference to the wire, is carried (supported by " the felt) direct to the drying cylinder." "The felt is pro- " vided with a washer and squeeze rolls for cleansing it whilst " in work." "Press rolls may be used if needed for this " purpose," but it is preferred to take "the web of pulp direct " to the drying cylinder."

[Printed, 4*d*. No Drawings.]

A.D. 1863, November 21.—No. 2931.

FENTON, FERRAR.—"Improvements in the treatment of " vegetable fibres for the production of paper pulp or half " stuff therefrom."

These improvements are said to be, first, "the application " and use to and in the boiling of all kinds of vegetable fibres " with a view to the preparation of 'half stuff' therefrom of " washes composed of dilute compound or simple acids or of " fluorides, either alone or in combination with acids, in lieu " of caustic or carbonated alkalies."

Second, "the application and use to and in the washing of " 'half stuff' after boiling" with the dilute acids of "alkaline " liquors, such as lime water, lime wash, lime, or solutions of " soda or potash either carbonated or not, with a view to " facilitate the thorough and even bleaching thereof."

Third, "the application and use to and in the boiling of " 'half stuff' of a wash composed of dilute fluorides, either " alone or in combination with acids."

"*In preparing* and bleaching 'gummy' and 'jute' other- " *wise called* Surat bagging and straw by one operation it is

" proposed to employ (after well washing the gummy in soda " ash ley hot or cold) a mixture" of 1 part by weight nitric and 5 parts by weight hydrochloric acid, about 4 parts are introduced into 100 gallons of water, after which about 50 gallons of "chlorine bleaching liquor" of from 2° to 5° are to be added; the material is boiled in this for a short time, when the fibre will be rendered white and perfectly soft, so as to pulp easily, and is removed and washed as above. "In the " preparation of esparto grass, flax waste, reeds, leaves of the " iris flag" into half stuff, the liquor used is 100 gallons of water, 6 or 8 lbs. by weight, more or less, of a mixture of 1 part nitric and 5 parts of hydrochloric acid. When treating bamboo or ratan cane, or other cane, in preference, 2 parts of nitric to 5 of hydrochloric acid, or 5 parts of sulphuric with one of nitric acid, are employed. The proportion of acids used may vary, and with some substances, where the silica is small, dilute muriatic acid alone is used; in other cases, dilute muriatic and sulphuric and sometimes nitric acid are used either separately or together. Besides the substances named above are " leaves of banana, plaintain palm, and aguava, otherwise " called Mexican fibre," and also wood fibre, refuse sugar cane " and indeed all other vegetable fibres, but more particularly " those of Dutch grass and papyrus reeds with a view to the " preparation of pulp or half stuff for the manufacture of " paper."

[Printed, 4*d*. No Drawings.]

A.D. 1863, November 25.—No. 2967.

ACCARAIN, Louis.—"Improvements in the manufacture of " paper, thread, cordage, and fabrics from beetroot."

These improvements are, "the leaf of the beetroot is first " washed and then placed in a press, which flattens it in the " form of a ribbon or strip, and deprives it of the greater " part of the water it contains. These strips are then sub" mitted to the action of a very fine metal comb, which re" moves the gummy matters and chlorophyllite, and separates " the fibre. In this manner fibrous material is produced, " which may then be converted into thread or cordage or " be manufactured into fabrics after being treated in the " ordinary manner of preparing flax by combing, drawing,

" spinning, &c., or it may be used as pulp for the manufacture " of paper, preparing it in a similar manner to rags by " stamping, washing, and otherwise."

[Printed, 4*d*. No Drawings.]

A.D. 1863, November 27.—No. 2980.

GRAY, Thomas.—"A new method of discharging color from " rags used for paper making or other purposes, and in " treating of vegetable fibres by such process."

This method is :—First steep the rags, if colored, in a solution of muriatic acid ¼ oz. to 1 gallon of water from 2 to 4 hours; sulphuric acid in used in place of muriatic for piece goods of cotton, hemp, or linen, or thin yarns. The rags are drained and immediately immersed in a solution of soda ash and chloride of lime, 1 oz. of soda ash dissolved in 1 gallon of warm water and 4 ozs. of chloride of lime (bleaching powder) to 1 gallon of cold water; these solutions are then mixed together, and, when the lime has settled down, the liquid is added to 1 gallon of warm water, and the rags are immersed in this liquid "for a space of time dependant on the judgment " of the operator." Or first take the "colored rags after " being cut up and dusted, place them in a revolving or " stationary tank, or any other suitable vessel, and boil them " in a solution of alkali or soda ash," 9 or 10 lbs. soda ash to one cwt. of rags, for 3 or 4 hours, after which they are washed in an ordinary rag engine until clean, adding to the engine about 10 lbs. muriatic acid, the engine trough being full of warm water, "it is then run into the revolving tank above " described," and "a solution of 8 lbs. weight of chloride of " lime" added; the whole is closed up, and the apparatus revolved for 15 minutes; then run off this and add more water with a solution of bleaching liquor about 2 lbs. to 6 gallons of cold water and 2 lbs. of soda ash mixed together, after which the rags are washed and ready for the paper making.

[Printed, 4*d*. No Drawings.]

A.D. 1863, December 15.—No. 3168.

***CHADWICK*, Henry, and CLENCH, John.**—"Improvements " *in utilizing* the waste liquors resulting from the preparation

" of fibrous matters in paper pulp making, and in the machinery " or apparatus to be used therein."

First, "the recovery of carbonate of soda from the waste " liquors resulting from the preparation of fibrous matters in " paper pulp making" as follows:—"When manufacturing " paper pulp from straw, esparto grass, hemp, jute, and other " fibrous materials," evaporating "the water from such waste " liquors" and "roasting to a dull redness the solid compound." The resulting black mass is afterwards deprived of its carbonate of soda by hot water; the carbonate may be causticized in the usual manner.

Second, "the construction of furnace with double arched " top for deflecting the flame on to the surface of the material " being operated upon, and with bars or plates suspended " from the top of the furnace for the rapid liberation of steam " and gases."

[Printed, 10*d*. Drawing.]

A.D. 1863, December 15.—No. 3169.

STÄRCK, Axel.—(*A communication from Matthew Carter.*) —(*Provisional protection only.*) — "Improvements in the " manufacture of paper from a material not hitherto used for " that purpose."

Employing "a plant of which the botanical name is the im-" perata cylindrica or saccharum cylindricum and the Spanish " name cisca;" the fibre is separated "from the dried plant, " bleached and reduced in a paper engine, or by similar means, " to pulp or half stuff, from which paper may be made in " the usual manner."

[Printed, 4*d*. No Drawings.]

A.D. 1863, December 23.—No. 3246.

RONALD, James.—"Improvements in and apparatus for the " conversion of ropes and other cordage into oakum, tow, and " paper stuffs, parts of which are applicable to tearing and " cleaning wool or hair on skins, and dressing 'waste' tow, " wool, hair, and other waste fibres."

"Opening the strands of the rope or other cordage by a 'sled' " or by hand, or in any other convenient way, and then winding " the yarns on to bobbins or coiling them into cans, and then

" taking (say) eight of the said bobbins or cans containing the " yarn, and giving an independent rotatory motion to each by " placing them in the case of cans on revolving platforms, or " in the case of bobbins on flyer spindles. The ends of each " of the yarns are then carried through separate heated tubes " for the purpose of softening the tar, and thence through " oblique lateral holes formed in a spindle which has an independent rotary motion, and which rotates at the same speed " as the bobbin flyer or revolving can, for the purpose of " taking out the twist in the yarn. The several ends of the " yarns are then led from their respective revolving spindles " to a pair of heated draw rollers and are thence carried on an " endless apron to a second pair of heated drawing rollers " mounted in front of a dressing cylinder or endless apron " travelling over a revolving cylinder," on the surface of which are a number of fine gill teeth. The cylinder "revolving upon " a fixed eccentric or cam having its axis upon the side of that " of the enclosing cylinder or apron, so that at one part of the " revolution of the gills and the covering cylinder or apron " the gill teeth will project through holes in the outer casing, " and at the other will recede back again, so as to relieve the " fibre from the gill pins" fit to be used as oakum. "When " untarred cordage is to be converted into tow and paper stuff, " it is not necessary to carry the yarns through the heated " tubes, nor is it necessary to heat the draw rollers."

[Printed, 10*d*. Drawing.]

1864.

A.D. 1864, January 2.—No. 7.

MARTIN, CHARLES.—"Improvements in the treatment and " preparation of materials for the manufacture of paper, " and in the construction of apparatus employed therein."

First, "the construction of the rotary boiler and the mechanism and arrangements connected therewith." The boiler is in "the form of an ordinary rotary boiler, and is suspended " upon an axis or trunnions, the rotary motion being produced " *by gearing* actuated by the known methods; steam is ad-

" mitted through the axis or trunnions; supply pipes for the " introduction of water and chemicals, and also an ejection " pipe being provided." "A series of projecting beds or platforms are arranged in the interior of the boiler, and also " a beater or beaters, which is or are actuated by the rotation " of the boiler, and between which and the beds or platforms " the materials under treatment are rubbed and beaten."

Second, "the maceration or partial maceration of the ma-" terials" under treatment "while in a heated state under " pressure."

Third, "the general arrangement and combination of me-" chanism and processes."

The rags, of a convenient size, are placed in the boiler, together with the water and chemicals (about 10 per cent. lime and about 5 per cent. soda or potash, or "the preparation known as " Anton Verwey's patent alkali' preferred"); steam is supplied and the boiler is put in motion. In about 5 hours the steam is turned off, a plentiful supply of water admitted, and the ejection pipe opened. "If found desirable the " operation may be repeated." The surplus water having been drawn off, "a solution of chloride of lime or soda with " a proportion of sulphuric acid" is introduced into the boiler, the temperature raised from 100° to 120° F. and the materials afterwards washed and heated as above with a solution of cream of tartar with sulphuric acid, and afterwards washed, pressed, and dried.

[Printed, 6*d*. Drawing.]

A.D. 1864, January 4.—No. 23.

LE HARIVEL, AUGUSTE LUCIEN.—"Improvements in the " manufacture of paper, papier mâché, cardboard, and other " similar articles."

This invention relates "to the manufacture of these and " similar articles from wood, straw, hay, esparto, and other " fibre yielding plants." The wood, in "suitable lengths, " is reduced into small shreds by running it against the " top of twenty or more circular saws placed one-eighth " of an inch apart on the same spindle," and the resulting material is passed through crushing rollers, or it may be fed at once into disentegrating mill-stones. "The wood should

" be green or at least damp, and the disentegrating stones " should be of a large diameter (from 5 to 6 feet at least), " with an eye proportionately large, so that the grist or " working portion of the stone may in no case exceed 18 or " 20 inches in breadth." The stones are very heavy and blunt, and "dressed and rodded" in such a manner that " they act somewhat like the knives of a beating engine, " and leave greater length of fibre in the pulp." "When " the pulp is to be used immediately, it is preferable to let " a small stream of water play into the eye of the stone " during the disintegrating process, as this has a tendency " to bleach the pulp." "Shavings, straw, hay, esparto, " and all fibre-yielding plants being previously cut short," are disintegrated as above, either "separately or mixed together in any proportion." "Common sawdust may also " be used, either alone or conjointly with any of the above, " but care must be taken to sift it thoroughly through two " riddles; this may be done simultaneously by placing them " one above the other," the upper riddle rejects coarse bits. and the lower one "separates dust and dirt." The pulp or fibre may be sorted by any of the flour dressing machines or by sieves. The materials before disintegration may be boiled with lime and soda ash, and (either crushed or otherwise) bleached.

[Printed, 8*d*. Drawing.]

A.D. 1864, January 8.—No. 56.

McLAURIN, PETER. — "Improvements in drying paper, " pasteboard, and similar or textile fabrics, and in the machinery, apparatus, or means employed therein."

"First, "the general arrangement and construction of ma- " chinery, apparatus, or means for drying" the above.

Second, "the impelling or drawing currents of air or gas " into the chambers for drying or desicating paper, paste- " board, or other similar fabrics."

Third, "the forcing of currents of heated or cold air or gas " into the cylinders of paper or pasteboard drying machines, " and causing them to be emitted against the under surface " *of the* paper or pasteboard for the purpose of drying the " *same*."

The substances "whether in sheets or webs are placed upon "the bands of the machine or a travelling machine" similar to that described in No. 2287, A.D. 1863, in preference in a close chamber, and currents of heated or cold air or gases are impelled or drawn into the rooms by fanners or other means. "For drying animal or tub sized papers" the temperature is "from 70° to 80° F., but for engine sized papers, pasteboard, "and such or similar fabrics, the temperature ranges from "100° to 170° F., but 160 is the temperature" preferred. "When paper or other similar fabrics are dried on cylinders," in preference, the currents of air or gas, hot or cold, are introduced by an aperture in one or both ends of the central shaft or axle, this aperture communicating with an opening in that portion of the shaft, and passing through the interior of the barrel, escape through numerous holes or openings made in the cylinders "directly against the under surface of the fabrics "being dried."

[Printed, 4*d*. No Drawings.]

A.D. 1864, January 25.—No. 202.

PIDDINGTON, JOHN.—(*A communication from Augustus Henry Tait, William Henry Holbrook, and Asahel Knowlton Eaton.*)—(*Provisional protection only.*)—"Improvements "in the manufacture of paper from straw and other analogous "vegetable fibrous substances."

The straw or other substance is first cut into short lengths, and "subjected to the action of a burr-stone or other grinding "action;" the ground straw is "passed through a winnowing "machine or through sieves or screens in order to separate from "it the finely ground particles of silica and other earthy matters," placed in a vessel of cold water and heated gradually to boiling, in preference by steam, draining off the colored water, and adding a solution of caustic soda or potash of 1½° Baumé strength "in the proportion of 70 gallons of the solution to "100 lbs. of the dry straw, and boil the whole from 5 to 6 "hours," then washing thoroughly with hot water and boiling the material for about 2 hours with a weak solution of muriatic or sulphuric acid, 1 gallon to 30 gallons of water, draining off the liquor without washing, and pouring into the stock a solution of chloride of lime, a "spent solution used "*in a previous* final bleach," and letting "it remain for 12 to

" 18 hours, setting free the chlorine from time to time by the " addition of portions of the acid solution above described," running off the acid and washing well with hot water, boiling in a second solution of caustic soda of the strength of 1° Baumé, again treating with acid as above, and finally with " chloride of lime in the usual manner."

[Printed, 4*d*. No Drawings.]

A.D. 1864, January 25.—No. 203.

IBOTSON, William.—" An improvement in the process of " bleaching materials for paper making."

This invention consists in " the employment of movable vats " containing the material to be bleached placed one above the " other in such position that the bleaching liquids may percolate through them successively from top to bottom by their " own gravity, the vats being so constructed and supported " that their relative position may from time to time be altered " as required." A chain passing over a pulley is " fixed in a " travelling carriage or crane, so arranged that any of the " tanks " " may be raised up by it and deposited on the engine " floor. The chain is attached to the tanks by means of the flange " or offset, and has two loops so that it may take hold of either " one or two of the tanks as may be required." From time to time the top vat is removed, " when the stuff is fully or " sufficiently bleached, or at any rate before any exhausted " liquor has begun to penetrate through the bottom vat," and " raising the other sufficiently high," introducing " another vat of fresh stuff at the bottom."

[Printed, 10*d*. Drawing.]

A.D. 1864, February 8.—No. 333.

EASTON, James, junior, and LEIGH, Thomas.—" Improved " machinery for manufacturing paper."

This invention consists in the " arrangement of parts for supporting and operating the table of the paper making machine " to produce the requisite 'shake' for closing or felting the " fibres of the pulp as it is flooded on to the travelling wire " cloth. Instead of giving the table a rocking or irregular compound vertical and longitudinal motion," supporting " the

" frame of the table by bolts, which pass through links that " depend from and are free to rock on studs carried by standards " at the opposite ends of the machine," to the front extremity of this frame attaching a pair of connecting rods, which are operated by excentrics, thereby imparting an oscillating endway motion to the table. " For obtaining the greatest available speed " of manufacture, that is, felting the fibres of the pulp," the forward end of the table is made adjustable in height, using for that purpose pendent links which are adjustable in length, and " are thus enabled to regulate to the greatest nicety the " degree of inclination required for the table." " This mode " of supporting the table gives it a tendency to return to its " normal position and thus in effect a balance action is obtained " which insures a smooth and regular motion with an economical " expenditure of power."

[Printed, 10*d*. Drawing.]

A.D. 1864, March 3.—No. 542.

IBOTSON, WILLIAM.—" Improvements in the manufacture of " paper and in machinery employed therein."

" The employment of knotters with one or more openings in " manner and for the purpose " as follows :—" Making one or " more openings in the back of the knotter if worked by jog, " or wherever may be most convenient if worked by suction, " and level with the upper surface of the plates," and making " similar openings opposite to them in the box in which the " knotter works," connecting " the openings in the knotter " with the openings in the box by flexible tubing." Then delivering " the 'stuff' on to the knotter so that there may be " a flow as nearly as possible over the whole surface of it " towards the openings, through which a portion passes, " carrying the dirt and knots with it," and this portion is returned " to the machine together with the back water from " the wire by the usual manner." " Before returning the stuff " and back water to the machine they may be passed through " an auxiliary knotter, by which the dirt and knots may be " arrested, and from which they may be removed without " disturbing the flow of stuff through the principal knotter on " the machine."

[Printed, 4d. *No* Drawings.]

A.D. 1864, March 12.—No. 627.

COLLYER, Robert Hanham.—" An improved apparatus and " process for the conversion of substances into material for the " manufacture of paper and textile purposes."

First, the invention relates to the process or processes. Second, " submitting the material to a hot bath of alkaline liquor prior " to the steaming or the use of hot air or both." Third, " the " use of concentrated alkaline solutions for the treatment of " fibres." Fourth, the arrangement and construction of the machine or apparatus. Fifth, " the use of a a slot or port so " arranged as to communicate steam to the under pipes of the " caged machine." Sixth, " the use of a trough in connection " with a caged revolving machine."

The machine is cylindrical, having a series of perforated pipes or tubes round and inside, placed " at various distances " from the internal periphery of the machine, which revolves " on gudgeons or fixed hollow trunneons, in which is placed a " slot at the under side, through which the steam, superheated " or not, or hot air is supplied to the radial pipes as they " revolve at the lower portion of the gudgeons. The radial " pipes are fixed into the nave which is attached to the discs " or end pieces; these discs also support the longitudinal " pipes which supply the machine with steam. The machine " revolves in a trough about from three to four feet deep; " this trough may be made circular, having an opening for the " doorway of the cage; this trough may be turned over, and " also forms a covering for the cage; in this alkali may be " introduced, and by the revolution of the machine the materials " will be thoroughly saturated with it. The trough may also " be used to wash at the various stages of the alkaline treat- " ment as required." The machine may be covered in by an external vessel, as shown in No. 1, A.D. 1863.

[Printed, 10*d*. Drawing.]

A.D. 1864, April 1.—No. 817.

LUNDY, John James, and IRVINE, Robert.—" Improve- " ments in the manufacture of paper."

These improvements are, the application of the herein-after mentioned substances " to the manufacture of paper, " the quantity to be used varying with the thickness and

" smoothness desired." "Silicates of magnesia, known commercially under the name of talc steatites or soapstones, " after being finely powdered or levigated with water," are used, also silicates of lime, or "the combination of two or " more substances which will produce the silicates and serve " to retain them in the paper when mixed with the pulp " during the process of manufacture." The silicates of lime or magnesia, or the two combined, may be used "previously " mixed with farina, starch, or with the size used in paper " making," or "the silicates may be mixed, prior to being " used, with finely powdered alabaster or gypsum, and " known commercially as 'mineral white,' 'pearl 'white,' " 'terra alba,' or with 'pearl hardening,' to produce the " desired result." "The analogous silicates, such as asbestos, greenstone, hornblende, mica, serpentine, or other " similar substances," are used after pulverizing or levigation, " mixed or unmixed, with farina, starch, size, gypsum, " alabaster, mineral white, pearl white, terra alba, or pearl " hardening, or before or after being purified or bleached, " where necessary to be decolorized by any of the processes " now in use for purifying or bleaching of barytes or other " similar substances." "The quantity of these substances, " which give the best result in practice," is found "to be " from 15 to 20 per cent. of the paper produced."

[Printed, 4*d*. No Drawings.]

A.D. 1864, April 4.—No. 834.

COOKE, Leonard.—"Improvements in the manufacture of " paper."

These improvements are, "the application of pulp, size, " coloring matter, or other substances, at two or more times, " or from two or more spouts or other equivalents, to the endless wire gauze belt of an ordinary paper machine," or to the endless wire gauze "of any other machine or combination of " machinery for making paper." Above the ordinary paper machine is a pulp chest or strainer, from which there comes a spout which conveys the pulp to a trough "which is or may " be furnished with two or more cross ribs, or any other " convenient arrangement of parts, for the purpose of spreading evenly, and preventing the too rapid flow of the pulp." The point of delivery of the trough is above or beyond the first vacuum box, and beyond this is placed a slice "to level "the pulp, size, colouring matter, or other substances, or a "roller may be applied instead of, or in addition to the slice." The moisture is removed by the compound material passing over a second vacuum box, and the compound paper arriving at a roller towards the end of the machine is sufficiently consolidated to be removed from the wire gauze and carried between the couch rollers in the usual manner. "It is evident "that when a compound paper is required with a fine surface "on each side, and an intermediate portion made of an inferior "material, two additional troughs and a corresponding number "of vacuum boxes must be applied to the paper machine. "It may likewise be desirable to apply additional troughs, "delivery trays, rollers, or other equivalents for supplying "size, colouring matter or other substance or substances to "the paper."

[Printed, 10*d*. Drawing.]

A.D. 1864, April 18.—No. 975.

STEVENS, JOHN.—"Improvements in machinery for drying "paper."

Employing machines, each consisting of an openwork drum of large diameter. The surface of this drum is made of wooden battens or laths, or of wire or open network. The drum is turned round when laying on and taking off the sheets of paper, but it is held stationary during the drying operation, and combined with the drum there is a sheet or web of woven fabric or other material, more than twice the circumference of the drum, which by turning the drum is wound up upon it. "In filling the machine the drum "is first turned round once, and its surface is thus covered "with the sheet or web; then the sheets of paper which are "to be dried are either singly or several sheets together, laid "on the remaining part of the sheet or web, and by turning "round a second time the sheets of paper are taken on to the "drum and they become enclosed between the two turns of "the sheet or web of the drum; in this position they are "dried." "The outer end of the sheet or web is attached to "a small roller. In changing the drum as above described "the sheet or web is drawn off this roller to be wound on the

" drum, and similarly in taking the dry paper off the drum " the sheet or web is wound up on to the roller, or a web may " be drawn round the drum tight, independant of the outer " web which encloses the paper, and this outer web only " attached, as before described." "Friction straps or apparatus are employed to prevent the sheet or web running off " too easily." Inside the drum there is mounted a fan wheel which is kept in rotation during the drying operation, thereby causing a constant circulation of air through the machine. This apparatus may be modified without departing from the invention.

[Printed, 2s. 4d. Drawings.]

A.D. 1864, April 23.—No. 1031.

BRUNEL, Bonnet Frederic. — (*Provisional protection only.*)—"Improvements in treating vegetable fibres, in con" verting them into pulp, in bleaching the same, and in " apparatus employed therein."

This invention relates to treating flax, jute, and other vegetable fibres. They are first steeped in a solution of carbonate of soda, and "removed to a chamber containing hori" zontal and vertical gratings, and provided with inlet and " outlet passages; after being spread in this chamber cur" rents of steam and chlorine gas are introduced." After exposure to this gas and steam the fibres are removed and washed in a washing and breaking apparatus with a solution of caustic alkali, maintained at boiling point by steam or otherwise. After some time the alkali is run off, and fresh water is admitted to clean the fibres. "They are then re" moved to be finished and bleached," in "a vessel, by " preference, spherical or cylindrical, free to revolve on " hollow axes, through which steam is admitted." There are charging and discharging apertures, and "in the inner surface " pins or studs, which act as agitators." "In addition to the " fibres the vessel is charged with a solution of hypochlorite " of lime and of alkaline oxalate, and the materials are kept " at from about 85° to 105° F." The liquid is then drained off the pulp, which will be then ready for the manufacture of paper, &c. "The proportion in which the hypochlorite of " lime is used is as follows:—To every 2 lbs. of fibre use 2

" quarts of solution of hypochlorite marking 6° degrees " Baumé. The strength of the other solutions before named " varies with the nature and state of the fibres."

[Printed, 4*d*. No Drawings.]

A.D. 1864, April 29.—No. 1081.

BROOMAN, Richard Archibald.—(*A communication from François Marie Bachet and Etienne Machard.*)—"A new " method of treating wood and other ligneous substances in " order to produce alcohol, and to obtain the cellular tissue " or fibre from such substances applicable to the manufacture " of paper and other uses."

This method consists in "treating wood and other ligneous " substances" as follows, whereby "alcohol is produced, and " the cellular tissue or fibre applicable to the manufacture " of paper and other uses obtained from such substances." " Take, for example, the wood of the fir tree, cut into " blocks perpendicularly to the grain, and about half an " inch thick, let them boil 12 hours in a liquid composed " of 10 to 12 parts of acid to 100 parts of water," the acid is inorganic, hydrochloric preferred; " the wood parts with " the gummy or incrusting matter under the form of glucose which dissolves, and the cellular tissue which remains when crushed under or between stones or between " rolls is a textile pulp. The saccharifying property of acid " is not affected by its action on the ligneous substances," and the solution may be used over and over again with addition of acid and water to maintain it at the proper strength. The solution is specially treated in order to obtain alcohol, and the ligneous residues well washed, and if from wood crushed, are immediately applicable to the manufacture of brown and coloured papers and pasteboard." When white paper is required, "the ordinary processes of bleaching are resorted " to," as follows:—The ligneous residues, after cutting or tearing, are exposed to the action of chlorine gas in water in a closed vessel provided with an agitator, then "washed in " cold water, boiled in a solution of soda or carbonate of " soda; after another washing, a bath of hypochlorite gives it " a final bleaching."

[*Printed*, 4*d*. No Drawings.]

A.D. 1864, April 30.—No. 1100.

NORTON, James Lee, GREGORY, Francis, and SALMON, James.—"Improvements in presses and apparatus connected "therewith, and in pressing fats, seeds, shoddy, cotton waste, "tobacco, and paper."

"A screw column is employed, and a nut with spur teeth "on its periphery; there is also a spur wheel fixed to the "cross head of the press, or held stationary in other con-"venient manner." Around these wheels two pinions are carried, and "held together so that they can revolve indepen-"dently, and their axis is mounted on a bevelled wheel "or it may be on a frame which is driven by power or "manual labour so as to carry the pinions around their "wheels." "If power be employed in driving the press, it is "convenient to use friction-gearing so arranged as to slip "when sufficient pressure has been obtained." "The pinion, "which is carried around the stationary wheel, is thereby "rotated, and it gives motion to the second pinion, which "gears with the teeth on the nut, and as the speed of gear "between the stationary wheel and the first pinion, and "between the teeth on the nut and a second pinion is slightly "different, the screw is slowly rotated and thus the pressure "is given." "Where it is desired to obtain a rapid motion "for raising and lowering the platten of the press, and where "the work on the press is light, the two pinions which in "pressing are held or clutched together so that they cannot "revolve independently, may be unclutched or free the one "from the other, and the pinion which gears with the teeth "on the nut may be clutched tight on the bevelled wheel or "frame which carries it; when this arrangement is made the "nut will make one revolution for each rotation of the bevelled "wheel or frame."

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1864, May 11.—No. 1192.

BROWN, James, and PRICE, Astley Paston.—"Improve-"ments in the manufacture of blotting paper."

First, "the incorporating or combining of glycerine or a "solution of glycerine with the pulp from which the blotting "paper is to be made."

Second, "the steeping or otherwise impregnating of blotting " paper in or with glycerine or a solution of glycerine."

The glycerine of commerce, or a solution of the same, is mixed "with the pulp when in the process of the manufacture " of blotting paper;" this " is most conveniently effected by " adding the same or a solution thereof to the material" about to undergo the pulping process in the engine, but it may be added "at any time during its production or conversion into " paper." The blotting paper manufactured is also impregnated with glycerine, or a solution of the same, by "immer- " sion or damping." Good results have been obtained by adding glycerine "in the proportion of from 10 to 20 parts by " weight to every 100 parts by weight of paper pulp," but the inventors do not confine themselves "either to the mode of " admixture or to the proportions given."

In the Provisional Specification there is a third process, it is " in the manufacture of black or dark colored blotting paper, " either by dyeing the pulp black or any other dark color " previous to its manufacture into blotting paper, or by dyeing " the blotting paper when manufactured." The advantages of this paper are said to be "a neater appearance on the writing " desk, inasmuch as any writing blotted off will be invisible " or nearly so on the blotting pad or paper."

[Printed, 4*d*. No Drawings.]

A.D. 1864, May 12.—No. 1204.

NORTON, James Lee.—"Improvements in machinery em- " ployed in tentering, stretching, and drying fabrics, paper, " and other materials."

These improvements are, in reference to this subject, "in drying paper it is convenient to combine with a drying " chamber or room a number of endless chains made with " clip links," afterwards described. "Each endless chain " passes round drums at its ends. These drums are mounted " to turn horizontally, and can be rotated at pleasure. In " filling the clips the chain is wound round by driving one " of its drums so as to bring up the clip links in succession to " the filling point, and each clip having received its sheet or " sheets, it carries it into the drying chamber; then the chain " is allowed to remain stationary, if necessary, in the drying

" chamber until the drying is completed, and then the chain " is again driven to take off the sheets and recharge the clips." " A number of chains being employed, the workman may be " kept constantly occupied in putting on and taking off the " paper." "The links of the chain are furnished with nipping " jaws, which are open at the point where the fabric is fed on " to the chains, and then shut down." The jaws are made of such a length that they nearly meet end to end, and support the fabric continuously. By means of a spring, conveniently made of vulcanized india-rubber, the jaws are caused constantly to spring open, "and after the material has been introduced " between them as the chain travels forward, inclines or rollers " shut down the jaws, and so lock them by placing a strut " (which each link carries in addition to the jaws) in such a " position as to prevent the jaws separating." "In place of " this strut a spring catch or other convenient fastening may " be employed." "The jaws or clips are formed at the part " where the fabric is held, with a recess for an india-rubber " ring to be inserted." In some cases the links are not rivetted together, but made "with a hook at each end, so that " the hook of one link may lock into the hook of the next " link."

For drying paper, in preference, a machine is made, "which " consists of an endless apron working to and fro horizontally " over a series of suitable rollers at each end of the machine. " On this apron the paper to be dried is placed, and is held in " its place by tapes or bands fastened securely at suitable " intervals, so as to be stretched tight, and have a tendency to " press close to the apron. The pieces of paper to be dried " are placed underneath these bands, and the apron carries " them through the machine. The necessary heat is supplied " by coils of steam pipes or a heating apparatus and fan or " steam blast, and the paper, when dry, is slipped from under " the tapes and taken out of the machine. If necessary, the " feed and delivery portions of this machine may be made " self-acting."

[Printed, 2*s*. 0*d*. Drawings.]

A.D. 1864, May 16.—No. 1232.

WOMERSLEY, JOSHUA.—"Improvements in the manufacture " of paper from certain fibrous substances."

This invention consists of "the machine for passing the " material (esparto grass, and other similar straws or grasses, " either separately or in combination) through rollers while " water flows on it," as follows :—The material is placed in a vessel of a truncated cone shape, wider at the bottom than at the top, in which is a vertical shaft turned by a drum, which shaft carries a cylinder having vanes or blades set obliquely, so that when the shaft and drum rotate the material is "mixed, pounded, and forced downwards." The shaft likewise carries arms with curved vanes, and "their rotation still further forces the material against the "sides of " the vessel," from whence it passes by a long aperture up a passage curved at the top to deliver the material to the washing rollers, which is done steadily by interposing a roller in the passage, furnished with projecting leaves like paddle vanes. The material comes from the passage upon an endless band made of wire, which "may be kept tight by a roller so " set as to allow either end to be raised a little when the band " requires to be adjusted, so as to travel fairly in its path." " The rolls for pressing the material may be arranged in five " or six pairs or more." The material pressed by the first pair of rollers is sprinkled with water, in preference hot, as it issues from between these rollers, it is again pressed by the second pair of rollers, and "is thus alternately pressed nearly " dry, and then wet and soaked," until it has passed the series of rollers to be further operated upon.

[Printed, 10*d*. Drawing.]

A.D. 1864, May 26.—No. 1310.

BROWN, John Harcourt. — "Improvements in treating " animal substances for the manufacture of size, pulp, and " pulpy matter, and converting the said pulp or pulpy matter " into sheets, slabs, blocks, thread, hollow or tubular articles, " and such other articles of convenience for which the said " slabs, blocks, threads, hollow or tubular articles may be " applicable."

These improvements are, in reference to this subject, making a pulp from the skins or cuttings of skins of various animals, by first soaking them in water and a bath containing potash until the epidermis can be removed by brushing, which is done, after which the pieces are crushed or bruised by stampers or hammers, &c., and spread out are placed in a dilute acid bath, 1 of sulphuric acid to 100 of water, "untill they assume a "jelly-like appearance;" the acid water is then drained off, and they are submitted to a clear bleaching liquor, chloride of lime solution of medium strength preferred, and when the fibre has become firm, hard, and, white, it is thoroughly washed in cold, soft water, in which is a little ammonia or its carbonate, "to kill the bleach." "A small proportion of alum "occasionally assists the purifying process." The fibre is manipulated in a beating engine, &c. like ordinary vegetable fibre, and the pulp is made into tracing paper. For fabricating fine writing papers 5 to 50 per cent. of the animal fibre is combined with ordinary vegetable fibres according to the nature of the paper required. Straw pulp with from 5 to 10 per cent. of animal fibre will produce a paper equal to papers made from rags. Cards for the jacquard machines are made of the usual vegetable fibre, with 10 per cent. of ordinary animal fibre. "The sheep and calf pieces do not require the "epidermis to be removed." Besides the making of paper the application of this animal fibre to a number of purposes is described.

[Printed, *6d.* No Drawings.]

A.D. 1864, May 30.—No. 1335.

DREW, Thomas, the elder.—"Improvements in the manufac- "ture of paper, papier mâché, and millboard."

This invention consists in applying the following substances in the above manufacture, "eriophorum vaginatum "(hares tail cotton grass), periophorum olystichion (broad "leaved cotton grass), eriophorum augustifolium (common "cotton grass), bryum ventricosum (swelling bog-moss), which "are indigenous to the United Kingdom." "These ma- "terials are reduced in a paper engine in the ordinary "manner, and used alone or in combination with other "ordinary materials." "The materials are first boiled in "river water for about two hours, or they are placed in boiling "water or in the alkaline solution" ("about 1 lb. of carbonate "of soda to 4 gallons,") and "allowed to soak for about 12 "hours without continuing the application of heat." "Or an

“ alkaline solution may be employed, and the materials boiled “ therein for about one hour.” The materials should be well stirred, and “afterwards well washed to remove any foreign “ matters and color.” If the fibres have not separated well, “ the process of boiling or soaking may be continued, or the “ alkaline solutions varied.” “The fibres thus obtained are “ then to be reduced in a paper engine, and rendered into “ pulp, as is well understood.”

[Printed, 4*d*. No Drawings.]

A.D. 1864, June 4.—No. 1391.

LEDGER, Edward.—“ A new machine for dividing into filaments various materials used in the manufacture of paper, “ such as rags, woods, barks, and fibrous substances.”

This machine consists of “ a rotatory engine either driven by “ steam or water power, and of any size to suit the number and “ size of the cutters employed ;” using, cutters in the rotary engine either toothed, fluted, grooved, or plain, in such a manner that a cutter of a different pattern follows a previous one, so as to divide the substance to be operated upon into filaments of uniform breadth and thickness. The invention is said to be “ the combination of different cutters in succession to each “ other in a rotatory engine to produce filaments of rags, “ woods, barks, and other fibrous substances used in the “ manufacture of paper, and of pulp used for other manufacturing purposes.” In preference “using a series of grooved “ cutters followed by plain ones.”

[Printed, 4*d*. No Drawings.]

A.D. 1864, June 7.—No. 1418.

WELD, Arthur Thomas, and POWELL, John Folliott.—(*Provisional protection only.*)—“Improvements in the separation of animal substances from rags or mixed fabric.”

These improvements are, first washing or steeping the mixed fabrics, in preference, in hot distilled water obtained by condensation of steam ; and whilst in a saturated condition subjecting “ the material in suitable chambers to the action of steam, either “ ordinary or superheated, at a pressure varying according to “ *time of* treatment and the nature of the material.”

"With ordinary steam at a pressure from 4 to 5 atmospheres, "the animal matter of mixed woollen rags will have undergone the requisite change in 30 minutes, and the time may "be reduced by superheating the steam. When the animal "matter is silk a longer period of exposure is required, and "the process is accelerated by the use in the wash or steep "water of a small quantity of soap or alcohol." The material when disintegrated is removed from the steam chambers, and dried (by any mode or by a hydro-extractor or Norton's stove) and the animal matter separated by an ordinary willow or beating machine. "The vegetable fibre will be found clear "of animal matter, and the colors so much loosened as to "bleach with the greatest facility." It is stated that by heating the mixed rags in a dry state "the colors of the vegetable portions become so fixed that bleaching is effected "with much difficulty and the value of the material for paper-making is found to be seriously impaired."

[Printed, 4*d*. No Drawings.]

A.D. 1864, June 22.—No. 1566.

CULLIN, THOMAS.—(*A communication from John Cullin.*) —(*Provisional protection only.*)—"Improvements in machinery or apparatus to be employed in the manufacture of "paper."

According "to one arrangement, the 'knotter' is placed "vertically in the vat, so as to form a central diaphragm "or partition, and is connected loosely to the bottom and "two opposite sides or ends of the vat by means of india-rubber, leather, or other suitable material which shall "admit of it vibrating or shaking under the action of a pair "of revolving tappet wheels." In each of these so-formed compartments "is placed a revolving agitator, the shafts of "which may be geared together by spur wheels outside the "vat, and motion may be imparted to them by a strap "and driving pulley, the latter being fixed on the shaft "of one of the agitators." "According to another arrangement," a smaller vat is placed inside the outer one, hung "upon pivots or centres at each side or end thereof. The "'knotter' plates are fitted one in each side of the inner vat, "which is shaken or vibrated on its pivots or centres by one "or more revolving tappet wheels. On each side of the inner

" vat and inside the outer vat is placed a revolving agitator, " a third agitator being placed inside the inner vat. The " shafts of these three agitators are geared together outside " the outer vat by spur wheels, and the whole operated by a " strap and revolving pulley."

[Printed, 4*d*. No Drawings.]

A.D. 1864, July 27.—No. 1870.

OLIVE, John, OLIVE, William, and PARTINGTON, Edward.—(*Provisional protection only.*)—" Improvements in " the manufacture of paper, and in the machinery and apparatus employed therein."

According to this invention, in place of conveying " the " paper from the drying cylinder to a callender provided with " any number of metal bowls," employing " bowls which " instead of being all metal are made some of metal and others " of paper, cotton, or other yielding material, the metallic " and the yielding bowls being placed alternately in the paper " machine callender." " When a highly glazed paper is " required," applying " a conditioning trough to the paper-" making machine ; this trough is furnished with a perforated " steam pipe to damp or condition the paper as it passes from " the last drying cylinder to the callender. The set or pres-" sure is given to the bowls by the usual weighted levers and " regulating screws ; but as it is essential in this description of " bowls to be able to relieve them instantaneously from pres-" sure," there is applied " for obtaining this object, a shaft " with cams or other equivalent to the weighted levers."

[Printed, 4*d*. No Drawings.]

A.D. 1864, August 11.—No. 2003.

ADAM, John, WEBB, John, and MONTEIRO, Joachim John.—" Improvements in the application and in the preparation of " certain fibres for the production of paper and textile fabrics."

These improvements are, " the employment of the fibrous " portion of the inner bark of the adansonia digitata after " having been subjected to suitable treatment or preparation " for the manufacture and production of textile or woven " fabrics."

The fabric is prepared, the outer bark having been removed *and the inner* bark having been obtained by stripping or otherwise, is dried, dessicated, or at once passed through rollers or other machinery for effecting its disintegration, so as to free it from sap, gum, and other matters. The crude fibre resulting is repeatedly washed with water, and "may be further sub-" jected to the action of an alkaline solution," washed with water and bleached by any of the well-known bleaching processes, "either by the employment of a solution of chloride " of lime or an acid, or otherwise, as is well understood." When the fibre so obtained is to be manufactured into pulp or paper, it is employed "either alone or in conjunction with " other fibres or substances in the same manner as esparto " or sparte and other fibres are now employed."

[Printed, 4d. No Drawings.]

A.D. 1864, August 16.—No. 2037.

DOVE, William.—"Improvements in applying water marks " in paper."

This invention consists in applying and using "water marks " or other similar marks or lines in or on paper as aids to in-" struction in writing, drawing, arithmetic, book-keeping, " correspondence, and similar purposes, and any one or all of " these." These marks or lines are produced by any of the " well-known means "by wires or other contrivances, or by " embossed, punched, or engraved plates," &c. while the paper is in the pulpy or moist state, or by remoistening it and subjecting it to the wires, &c. It is proposed "to have copies, " patterns, or forms produced by these means in different " kinds of letters, and figures, and designs," &c., and to cause " the pupils to trace, and delineate, or mark upon these " water-marks," &c. with pen and ink, &c., and "thereby " develope the true forms of such letters, figures, drawings, " or designs."

[Printed, 4d. No Drawings.]

A.D. 1864, August 16.—No. 2039.

DARCAGNE, Charles François.—"A new mode of treating " or preparing the sorgho plant (holcus sorghum), so as to " render the fibre thereof useful in manufactures as a sub-" stitute for horsehair and otherwise."

This invention consists "in separating the fibres of the " sorgho plant, which grows in America and Italy, but prin-

" cipally in France and Algeria," as follows :—"Steep or " soak the plant, either in its green or dry state, (until it " becomes soft) in a vessel containing salt water, without " the use of other chemical agents." Then "proceed to " cut the branches or paniculæ of the plant into pieces in " a machine similar to a chaff cutter; these parts of the " plant form a material similar to hemp, and the body or " main stem, and likewise the leaves of the plant and the " refuse therefrom, after it has been combed, are suitable for " pulp to manufacture into paper." The pieces of fibre are placed "in a double cylinder (formed with flutings or chan-" nels), working in opposite directions," and afterwards removed and combed in a combing machine; the fibres are then washed in tepid water, and are ready for manufacturing. " When it is desired to bleach the material for paper making," " a bath made of soda and chloride of lime, mixed with water " and a small quantity of cobalt blue," is employed. When the fibre is required for manufacturing into textile fabrics, the paniculæ are divided from the main stem and triturated, steeped, or boiled in a solution composed of 5 lbs. caustic lime and 8 lbs. of soda ashes to every 112 lbs. of fibre; crush it between rollers and boil it for about an hour in a solution of 4 lbs. carbonate of soda to every 112 lbs. fibre, wash it well and then comb it; when required soft, a bath of soapy water is employed. When it is to be bleached 10 lbs. chloride of lime to 112 lbs. fibre is put in the bath. A bath of dilute sulphuric acid, an oz. to 1 gallon of water, is employed, and the fibres are placed "alter-" nately in said baths, taking care to well wash the fibre " between each immersion, and also shortening the length of " time of each immersion." "In operating upon the fibre " for the manufacture of half stuff for paper makers," the whole of the plant is employed, and it is treated in the manner above described, with the exception that the breaking and bleaching may be performed in the ordinary rag engines used by paper makers.

[Printed, 4*d*. No Drawings.]

A.D. 1864, August 26.—No. 2106.

HATHAWAY, HENRY, and TODD, WILLIAM.—(*Provisional protection only.*)—"The application of a new material for the

" manufacture of paper, cardboard, millboard, papier mâché, " and other similar substances."

The "new material" is spent tan, and it is treated as follows:—"Macerating the tan in cold or hot water or a cold " or hot solution of alkali," until "the fibre is readily separable, or it may be carried on to that condition commonly " known as pulp." The pulp or fibre is then washed, and the remaining alkali "neutralized by acid, or the whole of " the alkaline solution may be neutralized by acid during " the process of maceration, steeping, or digestion." "The " fibre or pulp is then to be washed, filtered, or sparged," and if required to be bleached "it should be subjected to the " action of chlorine or other bleaching gas, solution, or " vapour."

[Printed, 4*d*. No Drawings.]

A.D. 1864, September 2.—No. 2157.

DUNCAN, William Lundi, and CHILD, Sydney Clulow.—(*Provisional protection only.*)—"Improvements in bleaching " coloured and other rags or other materials or half stuff, and " in rag engines for paper making."

These improvements relate to a new and more expeditious " mode of bleaching" the above materials. In the inside and on the bottom of the rag engine, made of iron or other suitable material, "is placed a perforated pipe going from " the rise to the fall of the rag engine," which is fixed to a steam boiler. Above this pipe is a perforated false bottom; " tubes are also inserted in the rag engine, made of lead " or any other suitable metal or material, or openings " made to put in the chemicals." The coloured or other rags are boiled with alkalies in the usual way, and put into the rag engine and "cleansed and turned into half stuff, " and when the water is of a suitable heat the steam can, " if required, be shut off, and chlorine and then diluted sulphuric acid, say, from 1 to 2 per cent. by Twadell's hydrometer, according to the materials or half-stuff operated upon, " are to be poured through the separate tubes or openings, " which, in meeting with the heated water will take out the " colours and completely bleach the half-stuff without damaging the structure of it. The steam is then turned on, and

" the cold washing water applied in the ordinary way till the " half-stuff is perfectly cleansed from the chemicals; it is then " ready for the purposes required by paper makers."

[Printed, 4*d*. No Drawings.]

A.D. 1864, September 21.—No. 2311.

COOKE, Leonard.—(*Provisional protection only.*)—"Improvements in the manufacture of paper cloth."

This invention consists in coating woven fabrics on one " or both sides with paper pulp on the ordinary paper " machines." The fabric "is steamed and damped before " it arrives at the endless wire gauze, belt, or cylinder of " the paper machine, and it is made to lie level on the " same by exhausters, fans, rollers, or other suitable means; " the pulp alone, or combined with the filling up, stiffening, colouring matters, sizes, and other materials, is " applied to the woven fabric either separately or combined, " and at one or more times. When the cloth requires a coating of pulp on each side, the first layer of pulp is applied " to the wire gauze from the strainer in the usual manner, the " woven fabric is then laid on, and a second coating of pulp is " applied; but when only one coating of pulp is required, " the pulp is applied to the wire gauze, and then the woven " fabric is laid on it, or the woven fabric is laid on the wire " gauze, and the pulp applied to it; or in some cases the wire " gauze may be entirely dispensed with, and the pulp is applied to the woven fabric, which may pass through the " machine without the support of the wire gauze." The " paper cloth thus produced may be used as drawing paper, " printing paper, and for other purposes; and it may also be " employed in the manufacture of artificial leather, table " covers, window blinds, oilcloths, emery or glass cloth, bags, " and for various other purposes."

[Printed, 4*d*. No Drawings.]

A.D. 1864, October 28.—No. 2668.

CHARLTON, John, CHARLTON, Henry, and CHRISTIAN, John Osborne.—"Improvements in sizing, dressing, filling " and stiffening yarns, or fabrics composed of cotton, linen, " silk, wool, or other fibrous materials or paper, whereby such " materials are also rendered non-inflammable."

These improvements are using and applying "hydrochlorate " of baryta or chloride of barium" for the above purposes. The baryta salt is "dissolved and made into a solution of any " required strength, and may either be applied to the materials " alone," or mixed with gum, starch, flour, farina, or other " sizing materials, and so be applied to the fibrous materials, " or it may be mixed in the pulp or 'half stuff' in the manufacture of paper." The use of the "hydrochlorate," it is said, " improves the appearance of the materials, and may also be " applied to render them non-inflammable, and also acts as an " antiseptic" "for the prevention of mildew and other fermentative decompositions."

[Printed, 4*d*. No Drawings.]

A.D. 1864, October 29.—No. 2685.

NORTON, James Lee.—"Improvements in tentering, stretching, and drying fabrics, and in drying yarns, wool, or other " fibrous materials and paper."

These improvements are, in reference to this subject, " drying of paper, cardboard, and such materials as re- " quire to be suspended when under the process of drying " in such a manner that the material may not be marked by " the holding instrument." For this purpose arranging "two " endless chains at convenient distances apart, these pass over " chain wheels fixed on each side of horizontal shafts, and to " the links of the chains cross bars are fixed parallel to the " shafts. On these cross bars clips are fixed at convenient " distances apart, and these may, if necessary, be made to " slide upon the cross bars, so that they may be arranged to " hold or suspend cards, board, paper, or other materials of " various widths. In arranging the clips for suspending delicate materials in place of the moveable jaw being pressed " tightly against the fixed jaw and held firmly by a spring catch " or other rigid fastenings," in preference, it is to "be pressed " down by a spring something similar to a letter clip, so that " when suspending a soft material similar to wet paper or " cardboard the material will not be marked by the clip. The " form of the clips may be varied." Besides the above, several forms of clips are given.

[Printed, 3*s*. 4*d*. Drawings.]

A.D. 1864, November 2.—No. 2706.

FORSTER, John, and DRAPER, Harry. — (*Provisional protection only.*) — "Improvements in the preparation or "manufacture of paper, in order to prevent the extraction "or alteration of writings thereon without detection."

This invention consists "in preparing paper, either during "the process of its manufacture or subsequent thereto." The following substances are used in any or all of the following ways :—First, "by combining in the texture of the paper 'artificial ultramarine' with Prussian blue or other metallic "compound."

Second, "by applying to the surface of the paper, either as "a complete coating or by an impressed or otherwise transferred design a mixture of 'artificial ultramarine' with "Prussian blue or other metallic compound."

Third, "by applying either as a complete surface colouring, "or by an impressed or otherwise transferred design Prussian "blue or other metallic compound to the surface of paper "already coloured with 'artificial ultramarine.'"

Fourth, "by applying either as a complete surface colouring, "or by an impressed or otherwise transferred design, 'artificial ultramarine' to the surface of paper already coloured "with Prussian blue or other metallic compound."

Fifth, "by chemically precipitating Prussian blue or other "metallic compound either in the texture or upon the surface "of paper coloured either superficially or throughout with "'artificial ultramarine.'"

Using any or all of the foregoing modifications in conjunction with a design or pattern, impressed or otherwise transferred to the paper in a fugative or other colour.

[Printed, 4*d*. No Drawings.]

A.D. 1864, November 10.—No. 2798.

COOKE, Leonard.—(*Provisional protection only.*)—"Improvements in the manufacture of paper, and in the "machinery employed therein, also in the manufacture of "paper, cloth, and woven fabrics."

First, "applying friction to paper in its damp state immediately after it has left the endless wire gauze of the paper "machine," by "substituting friction rolls for the ordinary

" press rolls, or applying friction rolls between the ordinary " press rolls, or before the ordinary drying cylinders, or after " the paper has passed one or more drying cylinders" for removing inequalities on the surface of the paper.

Second, subjecting the paper, in preference, before " it " arrives at the glazing calender or sizing machine to the " action of a revolving cutter with spiral or longitudinal " blades, or to a revolving brush, or to both, or to other " equivalent instruments" for removing inequalities, &c. on the surface of the paper.

Third, applying to the paper-making machine a self-acting combination of parts for taking up the breaks or restoring the paper when broken at the edges in passing from the couch roll over the various rolls to the drying cylinders. For this purpose "a sponge or other equivalent is connected to a lever " and spindle, and the lever is made to press against the roll " from which the paper is passing. When a break takes " place the paper accumulates between the lever and the " roll, thus displacing the end of the lever and bringing the " sponge or other equivalent against the roll on the sheet, " and beyond the break; the sponge is then drawn outwards " to the edge of the sheet of paper to prevent the break " extending."

Fourth, in the manufacture of paper cloth, especially that made according to No. 2311, A.D. 1864, "combining paper " pulp or fibres of cotton or other materials with the ordinary " size, stiffening, or filling" for woven fabrics by passing the paper cloth through an ordinary stiffening mangle or other suitable machine.

[Printed, 4*d*. No Drawings.]

A.D. 1864, November 19.—No. 2896.

EASTON, JAMES, junior.—(*Partly a communication from Francois Thiry.*)—" Improved apparatus for the manufacture " of paper pulp."

This apparatus consists of three steam boilers, heated by means of traversing fires contained in fire boxes or carriages. The boilers are horizontal cylinders fitted at their lower halves with a false bottom, "pierced with holes to allow of the free " circulation of liquor through them. The hinder ends of the

" boilers project beyond the brickwork which carries them, " to permit of a discharge opening closed by a valve overlying " an open trough," intended to receive and convey away the contents of the boilers when the operation is completed. In about the middle length of the boilers are safety valves, and " at either end there are manholes through which the boilers " are charged with cut straw and liquor." A horizontal rotating shaft carrying radial arms is provided in each boiler and from these arms chains " are pendant for the purpose of " turning over the stuff or cut straw contained in the boiler." These chains also " scrape or clear the perforated bottom." The supply of alkaline liquor is brought to the boilers by a horizontal main pipe which leads from the vessel in which the mixture is prepared. From this main extend branch pipes which lead respectively to the several man-holes of the three boilers. There is an arrangement of pipes "for the " purpose of discharging the steam out of one boiler (after the " completion of the operation) into another boiler and for " discharging the spent alkaline liquor from the apparatus." These boilers are used in succession.

[Printed, 1s. 2*d*. Drawings.]

A.D. 1864, November 22.—No. 2913.

IBOTSON, WILLIAM.—" Improvements in the preparation of " pulp for the manufacture of paper."

These improvements are passing the pulp "continuously from one engine roll to another, or from one part of an " engine roll to another part of the same roll, or from an " engine roll to the machine, through plates or between " bars," the slits "being finer in engine No. 2 than in " engine No. 1, finer still in engine No. 3, and so on, and " while the rags are fed into engine No. 1 at one end of the " series and passed through in the manner described in one " direction," and admitting " a stream of water impregnated " with chlorine gas into the engine No. 4, 5, or 6, as the case " may be, at the other end of the series and pass it through " in the opposite direction." "The knotter plates or bars " should be placed in knotters with outlets," as described in No. 542, A.D. 1864, " so that the stuff being thrown into the " knotter by the action of the roll, the finer will pass through

" the slits to the next engine, while the coarser portion is " returned through the outlets to the same engine." " It " will be easy to pass the water impregnated with chlorine " gas through the series of engines in the opposite direction " to the stuff by means of the ordinary wire revolvers and " strainers."

[Printed, 6*d*. Drawing.]

A.D, 1864, November 28.—No. 2963.

CROMPTON, JAMES ROGER.—(*Provisional protection only.*) —" Improvements in machinery for the manufacture of paper."

These improvements are " an improved method of taking the " pulp or paper off the wire web used in paper machines." " After the paper has been couched in the usual manner " common to the Fourdrineer machine," " the wire web, with " the pulp or paper adhering to it," is continued " partially " round another roller similar to an ordinary couch roller," and underneath this are placed " two press rollers similar to " an ordinary 'first press,' with the wet felt pressing between " the two last-named rollers." The top press roller " is " heated by steam or otherwise, and the wire web with the " pulp lying on its upper surface, after passing round the " second couch roller before named," is made to come into contact with the top press roller, and this roller being made to move either by gearing or straps at the same speed as the wire web, the paper or pulp is caused to leave the said wire web and adhere to the top press roller, and is continued partially round this roller, and passes between it and the one working in conjunction with it, the web felt intervening as in the ordinary press. The paper now leaves the heated roller and may be passed through a second press as is usual, and conveyed to the drying cylinders and finished in the ordinary manner.

" By another arrangement, placing the first press rollers " underneath the ordinary bottom couch roller in such a " manner that the top roller of this press will come in " contact with the pulp or paper." This plan is preferred. A doctor is placed so as to clear the heated roller of any paper or pulp that may unnecessarily adhere to it, and a moveable tray is suspended near it to catch the material scraped off. "The second couch roller is so arranged that "it may be lifted from the heated roller by a shaft and levers, "and still allow the wire to remain at the same or nearly the "same tension."

[Printed, 4*d*. No Drawings.]

1865.

A.D. 1865, January 2.—No. 8.

CROMPTON, James Roger.—(*Provisional protection only.*) —"Improvements in machinery for smoothing or finishing "paper."

First, "the paper in passing from one calender to another "often breaks, and causes considerable waste when the calen-"ders are coupled together by gearing as in common use;" to prevent the breakage of the paper, "driving the second set of "rollers or second calender by a separate steam engine, tur-"bine, or water wheel, by which means the paper passing from "one calender to the other may be kept at any desired tension." If more than two calenders be used, applying "a steam engine, "turbine, or water wheel to each additional calender."

Second, preventing "creased or folded paper when passing "through the calender rollers damaging the smooth surfaces "of the said rollers" by means of levers, screws, or inclined planes between the rollers, and these "are coupled together "so as to lift the rollers parallel to each other, or nearly so, "by the action of rods, shafts, wheels, worms, screws, or "levers, as may be most convenient."

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 3.—No. 15.

D'AUBRÉVILLE, Léopold.—(*A communication from Jules Joseph Manecy.*)—"Improvements in manufacturing paper."

These improvements are in place of "heating by steam "hollow cast-iron cylinders, round which the sheet or web "is coiled" for the purpose of drying the paper, using "a "*hot* room or chamber into which the endless web or sheet of

" paper is introduced and carried along by a special endless " chain which travels a distance of many yards within the " said room or chamber. The hot room or chamber is heated " by hot air, drawn out by a fan from the furnace used for " generating steam employed in the other departments of the " manufacture; the hot air being forced by the fan into the " hot room or chamber. The fire of the furnace must be made " with coke, and not with any kind of fuel producing smoke. " The sheet or web of paper, perfectly dried up, is then led " out of the hot room through a suitable aperture, and is " coiled around a cylinder, suitably disposed to receive it."

[Printed, 8*d*. Drawing.]

A.D. 1865, January 4.—No. 25.

JONES, JOHN FRANKLIN.—(*Provisional protection only.*)— " Improvements in machines for making paper board."

A large hollow cylinder, covered with wire cloth, is mounted on a frame. "Around this cylinder, in a circle and at a suitable distance therefrom, are arranged pressing rollers," made adjustable to it "by means of pressure screws and coiled " springs, or other suitable devices. The induction roller at " the top has a pressing device so arranged as to force said " roller away from the cylinder to admit the pulp, and the " other rollers have the pressing device so arranged as to force " the rollers down to the work. The boxes of these rollers may " be kept in position by means of set screws." Around these rollers passes an endless wire mesh apron, the distance between which and the cylinder is sufficient to allow the necessary depth of pulp to form the required thickness of board. When the web is carried to the last roller of the series "it is taken " up by an adjustable coucher, situated at an angle equidistant from said roller, and another roller placed in an exterior projection on the circular frame supporting said rollers " surrounding the cylinder." "A felt passes around the " roller on the exterior of the circular frame, and another roller " in the frame of the machine," on which "the web is carried " between thesaid roller in the frame and a similar roller directly " above." Within the cylinder is a shallow trough, having a discharge spout at one end to discharge the water pressed from the pulp at the top of the cylinder. The suction box is composed of three longitudinal grooved rollers situated within the cylinder at the top. The two upper ones reach the wire cloth surrounding the cylinder, and the lower one works between the other two. In the hopper is a vibrating bar for the purpose of interweaving the fibres of the pulp, &c.

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 7.—No. 62.

JONES, John Franklin.—(*Provisional protection only.*)—
" Improvements in machinery for the manufacture of paper
" board."

"The object of this invention is to produce paper board " in a continuous or indefinite length, which may be cut " into small sheets for ordinary use." A suitable frame is employed in which is fixed a circular bed, with a revolving grinding disk above and contiguous to said bed. The surfaces for grinding "are made dishing or inclined upward from the " centre outward in order to retain the pulp and its contained " moisture until properly reduced." For pressing the pulp thus formed into board, the machinery employed is on the Fourdrinier plan, and the pulp is passed between two endless wire aprons, the upper apron, the addition of which is a peculiar feature, "passes around a series of cylinders and " rollers mounted in a swing frame, consisting of swing bars " on each side of the main frame, which bars turn in on axis " supported transversely upon two vertical standards, extend-" ing upwards from said main frame." "Arms are jointed at " an obtuse angle with said swing bars at the top, inclining " outward and downward, and are connected at the bottom by " bars which support said cylinders." By these means the apron is made taut, &c. "On each side of the lower apron " rests an inverted box extending the whole length of the " apron. These boxes are named deckle boxes," as the ordinary deckle strap runs through them from end to end, and over pulleys in the usual manner. "In order to keep the " deckle strap close up to its work, a number of adjustable " rollers are made to press against its outer edge." The web of board formed by the apparatus described, passes over the ordinary suction boxes to a large roller. At a suitable angle to bear directly against the face of this roller without sagging the "apron, is a coucher having its bearings in arms at each

" end, and made soft by a covering of felt or other suitable " material," around which "passes a felt upward and forward " obliquely around a small roller; thence backward and " upward between the first press, consisting of large rollers, " and downwards into a wash tank where it is cleaned by an " ordinary felt beater, thence upward around rollers to a " hanger, through which it passes, and then down around " rollers to the coucher again." From the second press the web is passed between a series of ordinary drying cylinders held up by a felt against the bottom cylinders, "which felt " passes around carrying rolls. Calender rollers are employed " above the upper cylinders. From the drying cylinders the " web passes forward over a roller near two calender rollers " thence between these last, and thence over a hollow steam " table. Above this table are arranged a series of calender " rollers which press the web upon the table, and having " a motion greater than that of the web beneath, serve to " glaze its surface. Another or a succession of steam tables " may be employed, with calender rolls arranged in like " manner."

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 10.—No. 80.

CLARK, WILLIAM. — (*A communication from Zéphirin Gaspard Alexandre Nathan Pètrone Orioli, Amable Alfred Fredet, and Pierre Amable Henri Matussière.*)—" Improvements in preparing or treating wood and other vegetable " fibrous materials for the manufacture of pulp for paper." This invention consists of the following "process for transforming vegetable matters, and especially wood, into pulp " for paper, by the aid of aqua regia." "Reduce the wood to " shavings, or if straw or other vegetable matters of small size " into fragments, and then dry them for preventing any excess " of water from weakening the aqua regia;" "digest these " shavings or fragments in the acid bath until they have " absorbed their weight of the reagent, any excess of acid remaining after this absorption may serve the same as pure " aqua regia for a similar purpose;" the " ligneous matters " after being withdrawn from the bath are washed in plenty of " water, and the fibres then separated by means of a vertical

" mill similar to those employed in the manufacture of straw " paper." A pulp is thus obtained "of a yellowish brown " color, which after being again washed may be submitted " to the steeping and bleaching operations usual in the " manufacture of paper."

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 23.—No. 198.

SHELDON, ALFRED.—(*Provisional protection only.*)—" Improvements in apparatus for drying paper in sheets."

Employing endless bands, straps, or chains, in preference in a vertical position, "carrying numerous framed trays in " which the sheets of paper to be dried are placed, and held " by framed lids or covers securely, whilst the endless bands, " straps, or chains are caused to move in a suitably heated or " ventilated chamber." In preference, "the trays should be " parallel to each other, and at right angles to the endless " bands, straps, or chains." The trays and their lids are lightly framed, and as open as conveniently can be, "and they " are covered by cotton or other cloth between which the " sheets of paper are placed and held as the trays move to and " from the axes or shafts situated at the top and bottom or the " two ends of the apparatus."

[Printed, 4*d*. No Drawings.]

A.D. 1865, February 7.—No. 340.

CORNES, JOHN, and **SIMPSON**, WILLIAM.—(*Provisional protection only.*)—"Improved machinery for cutting, sifting, " separating, bruising, sacking, and preparing straw and " other vegetable fibrous substances to be employed in the " manufacture of various kinds of paper, and also for preparing food for cattle."

First, the fly wheel shaft is carried on a frame, at the back f this wheel are fixed "two or more cutting knives, there " are a pair of bevil pinions loose on the fly wheel shaft, " but with a clutch ; on the inside of a rack a corresponding " double-faced clutch is placed between these pinions, said " clutch slides on a feather let into the shaft, and is moved " by a lever placed close to a box and convenient for a man " to feed the machine. When this lever is in a vertical

" position both pinions are out of gear, and by moving said " lever to either side it fastens one or other of the two " pinions on the fly wheel shaft, one pinion being employed " to bring the feed forward and the other for taking it back. " These pinions gear into a bevil wheel of about three to " one; the loose pinions are kept in gear by collars at the " back." The "bevil wheel is keyed on a shaft placed at " right angles to the fly wheel shaft, but in the same horizontal plane and supported by two bearings on the frame. " On the outer end of the bevil wheel shaft a spur pinion " is placed for driving two spur wheels, one on each side " thereof; this pinion and wheels may be varied in size to " cut different lengths of chaff." The two spur wheels are " keyed on to the shafts of the rollers placed below; these " two rollers have fixed centres. Two connecting wheels " are also keyed on these shafts inside the frame and gear " with two corresponding wheels placed on the upper roller " shaft, the ends nearest the wheels have fixed centres; and the " motion is continued to the box by double universal jointed " shafts to allow for the rising and falling of the upper rollers as " the feed may vary." "The principal features of novelty " in this machine consist in placing the two upper rollers at " each end of two small beams, one on each side of the box; " a shaft passes through their centres on which revolves a " loose roller." On the "ends of this shaft are placed two " vertical bars or links passing below the box to the double " leverage, the weight at the end of the levers forming the " stay between them." The rollers are toothed, and the cutting knives are of a convex form, and either with knife or serrated edges. "On the periphery of the fly wheel are " placed six or more arms or fan blades which, as the chaff " is cut, lift the straw into a shoot placed in the upper part " of the casing."

Second, a machine or mill consisting of two cast-iron discs mounted on suitable framing, faced with hardened steel grooved plates, "one plate being fixed and the feed admitted " through its centre; the other plate revolves, the axis being " placed excentric to the aforesaid fixed plate. The discharge of the straw after passing between the disc plates is " effected round the outside edges. The running plate is " fitted with an adjustment at the end of its respective shaft

" to set the plates together. Six flyers or fans are placed
" round the outer edge of the running plate." The bruised
" chaff is forced into a shoot from the top of the said casing,
" said shoot terminating in a hopper, where the sacks are
" placed to receive it."

[Printed, 4*d*. No Drawings.]

A.D. 1865, February 25.—No. 532.

ROUTLEDGE, Thomas, and **RICHARDSON**, Thomas. —
" Improvements in the treatment and utilization of certain
" products obtained in the manufacture of paper or of paper
" stock."

First, "the lixiviating the black balls obtained in the
" manufacture of alkali by means of the spent leys or waste
" liquors resulting from the boiling process of esparto or alfa
" grass, straw, or other fibrous substances."

Second, "the employment or use of the liquor obtained by
" the process last claimed in the process of boiling esparto,
" straw, and other fibrous material."

Third, "the obtaining a ley or leys suitable for the treat-
" ment of esparto, straw, and other fibrous materials by
" boiling down the liquors resulting from the process," and
" afterwards destroying the organic matter therein by means
" of a red heat, and finally lixiviating the residuum."

Fourth, "the obtaining of a substance which after lixivia-
" tion is suitable for leys for the treatment of esparto, grass,
" straw, or other fibrous material, by concentrating or
" evaporating (to a pasty consistency) the spent leys or
" waste liquors resulting from the boiling process above
" claimed, and mixing the same with sulphate of soda, and
" then submitting the same to calcination."

Fifth, "the obtaining of a ley or leys suitable for the
" treatment of esparto, grass, straw, or other fibrous material
" by evaporating or concentrating to a pasty consistency
" the spent leys or waste liquors above claimed, and mixing
" the same with sulphate of soda, carbonate of lime, and
" coal, the ordinary materials of the black ball, and submitting
" the whole to what is known as the balling process, and
" then to lixiviation, as is well understood."

[*Printed* 4*d*. No Drawings.]

A.D. 1865, March 2.—No. 581.

PARK, JAMES.—"Improvements in machinery employed in "the manufacture of paper, part of which is applicable to "drying cylinders for other purposes."

First, applying "the steam required for boiling the rags or "other materials employed in the manufacture of paper for "giving motion to a small steam engine, by which the boiler "for the rags or other materials is caused to revolve slowly "during the process of boiling, the standards or other "supports of the boiler serving as foundation for the steam "engine."

Second, a "combination of machinery for keeping the endless wire cloth or felt of paper making machines nearly "at right angles to the rollers over which it revolves." "To "one of these rollers is fixed a scroll for working two palls, "the axle of the roller works in a bearing through which "a screw passes, and on this screw is fixed a tooth wheel "which is turned round alternately in contrary directions "by the two palls above referred to; these palls are in "communication with a rod passing under the wire cloth "or felt. The irregularities in the position of the wire cloth "or felt acting on the rod bring either pall in gear with the "toothed wheel and cause the roller to assume a diagonal "position until the wire cloth or felt has regained its proper "position, at which time both palls are out of gear."

Third, "constructing the drying cylinders of paper drying "machines with cast metal shells and wrought iron ends, "the ends being rivitted to the shells to avoid the necessity "of making a joint with cement or otherwise, and to economise labor and material." The remaining improvement is in a combination of machinery for cutting paper.

[Printed, 10*d*. Drawing.]

A.D. 1865, March 13.—No. 703.

WEBB, JOHN. — (*A communication from Joachim John Monteiro.*)—"Improvements in the application and utilization "of certain materials suitable for the manufacture of paper."

This invention consists in the "application and use to and "in the production of pulp suitable for the manufacture of "paper of [the woody fibre or structure of the Adansonia

" digitata." In order to obtain this woody fibre, the bark is first removed and the residual portion is either passed between rollers so as to extract the softer portion and washed in water and dried, or the decorticated portion may be immersed in water long enough "to effect the partial or entire disentegration or " separation of the softer portion from the fibrous consti- " tuents" and if necessary passed through squeezing rollers and finally dried, or "the decorticated portion may be sub- " divided and then dried." "The crude fibrous material " thus obtained may then be subjected to any of the usual " processes employed in the production of stock or paper " pulp." A good result is obtained by submitting it to a " weak caustic alkaline solution at an elevated temperature," washing it, submitting it to the action of dilute sulphuric or hydrochloric acid, again washing "it, and subjecting it to " the bleaching action of chlorine or of hypochlorite of lime, " or of soda, as is well understood by paper manufacturers." " The fibrous substance thus obtained may be employed " either alone or mixed in the manufacture of paper."

[Printed, 4*d*. No Drawings.]

A.D. 1865, March 17.—No. 752.

WILLIAMS, WILLIAM MAURICE. —(*Provisional protection only.*)—" An improved method of treating, cleaning, or pre- " paring painted or other canvas, tarpaulins. and dirty cotton " waste, so as to render the same suitable to be used for house- " hold and other purposes, for which they may be applicable."

"The pieces of canvas or fabric to be operated upon are " placed in iron cages" half the size of tanks into which they are placed; these tanks are "partly filled with boiling " water, to which is added from twenty to thirty pailfuls of " an alkaline solution," composed as follows, half a ton of " soda ash or other equivalent alkali, half a ton of lime, " quarter of a ton of borax, quarter of a ton of chloride of " sodium mixed in about 500 gallons of water." The cages are kept in constant motion in the hot "solution for about " three hours, during which time the solution is to be kept " boiling. When the paint or other coating has been detached " from the fibres the canvas is removed from the tank and " *thoroughly* washed in clean water," and "when thoroughly

" cleaned the canvas may be bleached and dried, and then cut " up into pieces of suitable size for sale " for "domestic or " other purposes such as for towels, knife cloths, dusters, or " other purposes, or for cutting up into garments. Pieces " and scraps that are too small for such purposes may be used " for the manufacture of paper."

[Printed, 4*d*. No Drawings.]

A.D. 1865, April 4.—No. 958.

BOUSFIELD, GEORGE TOMLINSON. — (*A communication from Antonio Meucci.*)—" Improvements in separating fibre " from vegetable materials containing the same."

These improvements are, " the process of treating vegetable " material with the substances produced by the action of nitro- " muriatic acid upon carbonate of lime and iron, or their " equivalents, and then subjecting the vegetable material to " the action of caustic alkali," as follows :—Also " the treating " of the vegetable material previously subjected to the action " of the gaseous substances " afterwards mentioned "with a " mixture of alkali and oil" as follows :—" The vegetable ma- " terial used may be wood, straw, hay, leaves, stalks, husks of " maize, rushes, linen or cotton rags, old rope, or similar " substances." The substances may be treated "in several " modes, all embodying the same principle. A good mode is " to exhaust the air as completely as possible from the vege- " table material, and then to treat it in a wet state with the " substances produced in the gaseous form by the action " of the compound acid upon oyster shells and cast iron." As wood is the most difficult to treat the mode of proceeding with it is given. The wood is " split in the direction of the " grain to a thickness of about one-sixth of an inch more " or less " and soaked in water, passed twice between crushing rolls and washed each time, is drained and placed in an air-tight vessel and the air exhausted. The gas generator in which are the oyster shells and iron is connected with this vessel and the nitro-muriatic acid is added gradually through a funnel pipe extending near to the bottom, as the gas is absorbed until "the wood is saturated with the gases," the vessel is then opened and the wood is removed and placed in a bath of alkali for twenty-four hours, more or less, when it is passed through crushing rollers, washed, "macerated

" either in a stamping mill or in the ordinary pulping " engine," and again washed and then " soaked for two or " three hours in a bath of water containing from two to five " per cent. of acid," muriatic preferred, after which it may be pressed and dried if required, or it may be bleached with chlorine in the usual manner for bleaching paper pulp. The quantities of acid and other materials used in producing the mixture of gases are given, likewise the strength of the alkaline bath. The wood after the first treatments instead of being subjected to the gases themselves may be placed in a watery solution of the gases previous to placing it in the alkaline bath. At the beginning of the operation the watery solution of the gases " should be kept cold by ice and after the vegetable " material has been steeped in the solution the temperature " should be raised to about 95° F. to hasten the operation." Another mode " is to subject the vegetable material to a dry " gassing by the mixture of gases before wetting it and treat- " it with the alkali. The split wood if not already dry should " be dried by stoving it, after which it is placed in the vat " upon a perforated diaphragm, and when the gas escapes at " the perforations of the cover of the vat water is poured into " the vat until the wood is covered, and the wet gassing is " continued until the wood becomes yellow throughout its " entire substance, when it is withdrawn from the vat drained " and "steamed until it becomes tender" after which it is " wetted with the caustic alkali, or with a compound of caustic " alkali and oil, and it is crushed in an ordinary putty mill " until it is reduced to a fibrous mass, the wetting with the " alkali or with the mixture of the alkali and oil being con- " tinued during the crushing. The use of oil renders the " fibrous material more elastic." The material should then be washed and bleached, if required, by steeping first in dilute acid and then in a solution of chloride of lime and washing, &c.

[Printed, *6d.* No Drawings.]

A.D. 1865, April 8.—No. 1005.

WEATHERLY, WILLIAM.—"Improvements in sizing paper " and in the machinery employed therein."

The paper to be sized is first passed over one of two rollers which are mounted at each end of a swinging arm which vibrates on its centre from an axis supported by a standard of the framing, it is then passed under the central axis and lower roller and over a roller which is fitted to the outer ends of two bell-crank levers connected to small rods at each side of the framing, the paper is then passed under a roller carried by two arms which are centred to a bar, at the outer ends of which arms the second of two sizing rollers is free to revolve; two other arms, extending in an opposite direction, are also centred to the same bar the outer ends of which carry pinions which gear into a segment-shaped rack fixed to the side frames, the spindle of the pinions being weighted to counterbalance the weight of the second sizing roller, the paper is then led through press rolls to the ordinary reels. The arms are now raised by means of the segment rack and pinion, the second sizing roller at the opposite end of the other set of arms being simultaneously depressed, the bell-crank levers are put in motion and the roller in connection therewith is brought into a horizontal position and clear of the paper. The second sizing roller, being thus immersed and carrying the paper under it, puts tension thereon, and causes the two rollers mounted on the ends of the swinging arm to turn upon their central axis whereby the paper is brought down upon the top of the first sizing roller the bottom of which revolves in the size trough and sizes the under surface of the paper; this sizing of one side of the paper moistens it, drives out the air, and renders it more fit to be submitted to the second sizing roller. The first sizing roller is driven at a greater speed than the second to relieve the soaked portion of the paper from strain or pull and to ensure a sufficient supply of size to the under surface of the paper before entering the trough.

[Printed, 10*d*. Drawing.]

A.D. 1865, May 17.—No. 1365.

HAIGH, William.—"Improvements in mechanism or apparatus for making and cutting cardboard."

First, "the employment and arrangement of rollers containing paper in combination with the means of applying the adhesive material to the upper or lower surface of the paper."

Second, "the general arrangement and construction of the "apparatus for supplying, pasting, and consolidating the "lengths of paper together to form cardboard."

Third, "subdividing the lengths of cardboard so manufac- "tured into smaller pieces by knives or blades, with serrated "edges, actuated by manual labor or mechanical means."

In the frame of a machine, brackets are arranged to support three rollers containing separate continuous lengths of paper; the under roller and top roller contain the lengths of paper, which ultimately form the outside surfaces of the cardboard and are of better quality, and the middle roller "contains the "intermediate layer or thickness of paper of inferior quality. "The three lengths of paper are delivered at one uniform "speed, and proceed in separate lengths until they arrive at "the pressure and drawing rollers," and "the intermediate "sheet before arriving at these rollers passes between a pair "of sizing rollers, a great portion of the under roller" revolving in a size trough distributes a layer of adhesive material over the under surface of the intermediate sheet, the upper surface receiving a similar coating from a pipe above, which is distributed over its surface by the upper sizing roller; the three lengths of paper are united by passing between pressing rollers, and the sheet of cardboard is carried by a travelling cloth through a second pair of rollers, after which it is cut into lengths by a reciprocating cutter.

[Printed, 10*d*. Drawing.]

A.D. 1865, May 30.—No. 1486.

COLLYER, ROBERT HANHAM. — (*Provisional protection only.*)—"Improvements in the process and apparatus for the "treatment of materials for the manufacture of paper, and "other purposes."

These improvements are, "submitting straw, esparto, jute, "flax, maize, rhea, plantain, and other like vegetable sub- "stances to the action of concentrated or strong caustic "alkaline solutions" as follows, "in order to ensure the rapid "and uniform distribution of the alkaline solution," (which in preference is in a boiling state), throughout the mass. The material, after the alkaline bath, is heated in another vessel with steam, in preference, superheated, "or other hot agents "until the process is completed." For these purposes, employing a tank or receptacle in which the alkaline solution is placed. The vegetable material is put into a holder "con-" structed of strong angle iron or other suitable frame, which " is filled in on all sides with wire work or other perforated " or reticulated material," and is dipped into the alkaline solution. "The reticulated holder may be used with any " convenient form of vessel, with or without pressure. The " vegetable substance having been dipped into and removed " from the alkaline solution, is to be removed from the holder " and placed in a suitable vessel for the finishing process." The vessel preferred, is described in No. 627, A.D. 1864. When the material is reduced to pulp, it is submitted to a cylindrical screening machine, in preference, revolving "in a " concave recess to ensure the presence of a certain quantity " of water to keep the pulp in a liquid or semi-fluid state; " the pulp is introduced into the screen through a hollow " shaft by preference."

[Printed, 4*d*. No Drawings.]

A.D. 1865, June 13.—No. 1602.

ROUTLEDGE, THOMAS, and **RICHARDSON**, WILLIAM HENRY.—"Improvements in the manufacture of paper, and " paper stock, and in the utilization of certain waste products " resulting therefrom."

These improvements are, in reference to this subject, as follows:—

First, "treating esparto or alfa, straw, and other fibrous " substances or rags in the boiling process with leys obtained " from the lixiviation with water of balls, as usually manu-" factured in alkali works, or specifically made for the pur-" pose," in this last case adding "such a quantity of chalk " or limestone in the boiling process as will ensure the proper " proportion of caustic soda necessary" for the purpose, say about "10 per cent. of carbonate of soda."

Second, pressing, by hydraulic pressure or otherwise, or submitting them to a centrifugal hydro-extractor or rollers the fibrous materials, after being boiled or drained, so as to press out and save "the alkaline and extractive matter, and also " flatten and open the fibres," for converting "into 'stock' " or for bleaching."

Third, "boiling down the liquor obtained by the above " process of pressing, either alone or together with the spent " leys or waste liquors obtained" from the "first process, or " spent liquors produced in the ordinary manner, and inci- " nerating the mass so produced; this mass may be lixiviated " and the liquors "may be used alone or mixed with the leys " at present employed for treating esparto or other fibrous " materials or rags."

Fourth, "adding to the leys or liquors so obtained, or to " the products of boiling them down, caustic, hydrate carbon- " ate, bicarbonate, or any suitable salt of baryta to precipitate " any sulphates present, and applying the purified solution " for boiling the above materials."

Fifth, using an aqueous solution of chlorine gas in lieu of a solution of bleaching powder, or "a solution of chlorine in " water, containing magnesia, alumina, soda, or potash for " bleaching esparto and other fibrous substances or rags, and " if desirable, increasing the energy of the bleaching agent " by the addition of sulphuric, muriatic, oxalic, tartaric, or " acetic acids, or any one or all of them."

[Printed, 4*d*. No Drawings.]

A.D. 1865, June 17.—No. 1634.

DELTOUR, WILLIAM.—(*Provisional protection olny.*)—"An " improvement in the preparation of vegetable fibre for the " manufacture of paper."

This invention "consists in preparing a caustic alkaline " solution as hereafter named, and then boiling the vegetable " fibre in the same for removing the silica, gums, and other " matter from the fibre. The caustic alkaline solution " (which is to be made of about four degrees of strength by " the ordinary alkalimeter or soap boiler's glass), is pre- " pared in a vessel provided with steam pipes in the bottom " perforated, so that the escape of steam will agitate and " heat the mass." Into this vessel is put water, with about equal proportions of soda ash and quicklime; the first ley thus produced is drawn off, and "more water is added from " time to time until the caustic alkali is taken up." The proportion of water is determined by the condition of the soda ash and quicklime. The vegetable fibre, in preference, previously passed through rollers, is placed in a tank or vessel upon a perforated bottom, beneath which are steam pipes, and "exposed to a boiling operation in the alkaline solution prepared as aforesaid." In preference, the perforated bottom of the boiling or heating vessel is made in sections. The above method of boiling separates the silex and other foreign matters more thoroughly than heretofore, and "the fibre is in a condition to be more easily separated by the ordinary washing and pulping engines, and manufactured into paper."

[Printed, 4*d*. No Drawings.]

A.D. 1865, July 3.—No. 1756.

JONES, John Franklin.—"Improvement in machines for "making paper board."

This invention relates to the production of paper board in a continuous length by a peculiar construction and arrangement of parts, as follows:—

First, a hollow cylinder "constructed so as to confine the "pulp in place to be pressed, and provided with a wire mesh "and rods, or equivalent so arranged as to form the pressing "bed, and to allow the expressed water to pass through."

Second, the combination of an open wire mesh or perforated "cylinder," wire apron, and pressure rollers, "for forming "paper board in a continuous or indefinite length."

Third, the employment of the adjustable coucher in combination with the end roller and coucher and felt.

Fourth, the water receptacle or trough in combination with the hollow cylinder.

Fifth, "the suction box or boxes composed of rollers, so as "to produce the necessary suction."

Sixth, employing a vibrating or reciprocating bar in the hopper, for the purpose of interweaving the fibres of the pulp preparatory to being pressed.

See Abridgment of Specification, No. 25, A.D. 1865.

[Printed, 8*d*. Drawing.]

A.D. 1865, July 6.—No. 1787.

JONES, John Franklin.—"Improvements in machinery for "the manufacture of paper board and paper."

The object of this invention is to produce paper board in a continuous length, which may be cut into small sheets for ordinary use.

The improvements consist :—

First, "forming the grinding surfaces of a bed and revolving " disc," "dishing or inclined upward from the centre outward, " in order to retain the pulp and its contained moisture until " properly reduced."

Second, "the combination of two wire mesh aprons" between which "the pulp passes with suitable pressure rollers, or " equivalent for forming board in a continuous or indefinite " length." The machinery is on the ordinary Fourdrinier plan. The second endless wire apron is placed above the first.

Third, "The construction and arrangement" of a frame and its use in connection with an endless apron and two cylinders.

Fourth, the deckle boxes in combination with the endless aprons.

Fifth, the employment of adjustable rollers in connection with the deckle straps and boxes for the purpose of holding the straps to their work.

Sixth, the arrangement of the soft coucher, felt, first press, wash tank, and felt beater, used in combination with the endless apron and roller "in such a manner as to take the web " from the said apron and convey it upward to the press " without injury or loss of pulp."

Seventh, employing the steam table or tables "for the " purpose of drying the web after the same has passed the " drying cylinders."

See Abridgment of Specification, No. 62, A.D. 1865.

[Printed, 1*s*. Drawing.]

A.D. 1865, August 2.—No. 2002.

BURDON, WILLIAM WHARTON.—"Improvements in reducing " vegetable fibre to pulp, and in machinery employed therein."

These improvements are, taking "rope or jute, or any other " vegetable fibre, and reducing it by cutting or otherwise into " small pieces, and subjecting it to the action of discs of wood, " stone, or iron, rifled, channelled, or furnished with blades, " and made to revolve in a vessel containing alkaline or saline

" solutions, and water confined by an outer rim." "To pre-" vent the fibres from becoming entangled, and from falling," inserting "pins in the lower disc, or in some convenient part " of the vessel." After the fibre is sufficiently reduced it is run "out from the vessel through outlets provided for the " purpose." If the fibre be colored, it is treated with "weak " solutions of chlorine after running off the first-named " solutions, and thus prepare the fibre for subsequently " bleaching."

[Printed, 8*d*. Drawing.]

A.D. 1865, August 10.—No. 2076.

MENDEL, ALEXANDRE. — (*Provisional protection not allowed.*)—" Improvements in the manufacture of paper."

"The application in this manufacture of fibrous material " from the plant known as Bombax Malabaricum, or Gossampinus Alba, and found largely in the island of Java, and in " Singapore and neighbouring islands."

[Printed, 4*d*. No Drawings.]

A.D. 1865, August 17.—No. 2128.

SZERELMEY, NICHOLAS CHARLES.—" Improvements in the " manufacture of paper boards and pipes."

"The manufacture of paper boards and paper pipes by " combining suitable paper in layers by means of a composi- " tion of cement, consisting of tar, French siccatif, zopissa, " and glue, substantially" as follows :—" The paper employed " is first prepared by being saturated by one or other of the " three compounds after mentioned, and the sheets or pieces " of paper are then combined or cemented together" by means of a cementing compound composed as follows :—" One ton of " coal tar, one ton of French siccatif, half a cwt. of zopissa, " which is found in Arabia and also in America, one hundred- " weight of fibrous pulp such as is used in making paper, one " hundredweight of glue dissolved in sixty gallons of water." " In preparing this compound the coal tar is heated to a boil, " the French siccatif and the zopissa are stirred in and mixed, " then the pulp and glue are added, and all are well com- " bined." In preparing the paper, if it be very soft and very porous, it is saturated with a solution of the following salts :

—"One part by weight of chloride of calcium, one part by " weight of acetate of lime, twenty parts water." If the paper is less soft, it is saturated with a solution of "sillicate of potash " and artificial sulphate of baryta in equal parts, in about " sixteen parts of water." " These two solutions may be used " in succession in cases where the paper after being saturated " with the first solution is found after drying to absorb water." " Other papers are saturated with the following compound :— " Anhydrous gypsum and caustic potash in equal parts or " proportions in about ten parts of water." The paper in each case is dried after saturation.

[Printed, 4*d*. No Drawings.]

A.D. 1865, August 23.—No. 2171.

MONCKTON, Edward Henry Cradock.—(*Provisional protection only.*)—"Improvements in the manufacture of the " straw of rye and other straws and grasses into fibre, and " utilizing the refuse."

The materials to be converted into fibre are, "the thrashed " stalks or straw of wheat, barley, oats, and rye," the last preferred, and also grasses. "First, when necessary, cut off the " heads or ears," then subject the straw to pressure between rollers, and then place the straw in a solution of caustic alkali, either applying heat with pressure, or steam under pressure, or otherwise, "or else employ the alkaline solution cold. The " alkaline liquors are renewed as they become entirely or " partially saturated, and the removal of the silica is accele- " rated" by "subjecting the straw to agitation and compres- " sion by employing press boards raised and lowered " alternately." "The straw during this process is inter- " mediately subjected to rolling, in order to separate the " fibres and to detach the silica or the silicious portions." The fibre thus prepared is "subjected to the usual common " processes applicable to hemp, flax, tow, and other fibres," and is fit for purposes alone or mixed. The refuse, such as the heads, are utilized by "removing the silica or silicious " portions as above described as applied to straw, and then " pulping the fibre or residue," and employing it when applicable as in "papier mâché by combining the pulp with " cleansed and pulped leaves, pulped hemp refuse, pulped " wood fibres, and similar materials." These pulps are mixed

" with lac and gums by the hot process, or with solutions of " the same," and moulded into useful articles. The refuse liquors are applied as manure.

[Printed, 4*d*. No Drawings.]

A.D. 1865, August 31.—No. 2248.

NEWTON, William Edward. — (*A communication from James Brewer Brown.*)—" An improvement in the manufac- " ture of paper pulp."

This invention consists in "treating fibrous materials, such " as wood, fibre, hemp, manilla grass, and other similar fibres, " after the same have been reduced or cut up into small " particles with chlorine gas in a dry state." The materials are "under continuous agitation in a close vessel, so that a " pulp may be obtained which will readily absorb water, and " which can be worked into paper either alone or mixed with " ordinary paper pulp." " The fibres are operated upon until " the pulp assumes an orange color, when it is considered " ready for the paper manufacturer. The pulp improves if it " is confined for some time with the acids formed by the " action of the chlorine gas; and when the pulp thus pre- " pared reaches the paper mill it is to be soaked in water and " treated by any well-known processes whereby it may be " converted into paper."

[Printed, 4*d*. No Drawings.]

A.D. 1865, September 21.—No. 2404.

TROTMAN, Sanders. — (*Provisional protection only.*) — " Improvements in the manufacture of paper."

This invention consists in separating silica from straw or other like vegetable products used in the manufacture of paper, without the use of caustic alkalies, as follows :—A solution of a carbonate of an alkali, by preference of carbonate of soda or " potash, of a specific gravity of from 1,000° to 1,100° when " cold," is placed along with the straw or other substance to be acted upon in "a jacketted digester or vessel with two skins, " into the interspace between which skins high-pressure steam " is admitted from an ordinary steam boiler." The substances are " subjected to steam heat and pressure for, say six to eight " hours. The solution of carbonate of soda or potash, under

" pressure dissolves the silica, and the resulting solution may " be drawn or driven off, leaving the lignine to be dealt with " in the ordinary manner. This solution, when cold and " exposed to the action of the atmosphere, yields a precipitate " of silica. The precipitant or carbonate of soda can be used " again in future operations."

[Printed, 4*d*. No Drawings.]

A.D. 1865, September 27.—No. 2472.

EVELEIGH, GEORGE.—"Improvements in the manufacture " of paper, by the introduction therein of a new vegetable " fibrous substance."

This invention relates to the exclusive use of "the palmiet " or prionium palmeta plant" in "the manufacture of paper, " whether alone or in combination with other substances." The plant is submitted to a series of operations for cleansing, breaking, or cutting up, soaking, straining, fermenting, bleaching, drying, passing through rollers, treating with alkali, &c. To "obtain a substance more suitable for making the " finer qualities of paper," "some portion of the outer coating " of the stem and root of the plant are removed."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 2.—No. 2523.

ABEL, CHARLES DENTON. —(*A communication from John Peter Caminade.*)—(*Provisional protection only.*)—"Im- " provements in the mode of treating the roots of the lucerne " plant for the purpose of manufacturing paper, pasteboard, " fabrics, and ropes therefrom."

"When the lucerne fields are dug up, the roots are collected " and then submitted to the pressure of revolving stone " rollers," and the crushed roots are either "soaked in retting " pools, where they are allowed to remain until the process of " maceration is accomplished," or "the crushed roots are " placed in boiling water, by preference heated by steam, " until the fibre alone remains." "For preparing paper or " pasteboard from such fibre it is reduced to a pulp, and is " treated with chlorines or hypochlorides in the usual manner, " after which it is manufactured into paper or pasteboard in

" the same way as is the case with pulp from rags." The fibres obtained are of considerable length, and may " be spun " into threads, and then manufactured into textile fabrics or " ropes."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 6.—No. 2574.

CLARK, WILLIAM. — (*A communication from Messieurs. Neyret, Orioli, and Fredet.*)—" Improvements in apparatus " for steeping or treating paper pulp and other matters sub- " jected to the action of alkalies."

A " closed case of cylindrical or other form (of sheet iron or " other metal), in which are placed the products to be treated, " and the barium, soda, potash, ammonia, or other solution ; " this case is enclosed on all sides by a second cylinder, so as " to leave a concentric annular space in which is introduced " steam." " The outer casing is connected to the first men- " tioned, and is carried in hollow bearings fitted with stuffing " boxes, one of which bearings conducts the steam from a " suitable generator into the apparatus, the other bearing " being furnished with a turbine wheel having several branches " serving to raise the condensed water into the double casing, " and reconduct it to the boiler," thus creating a circulation and rendering the boiler self-feeding ; " for this purpose the axis " of the steeping apparatus should be above that of the boiler. " The apparatus is further furnished with cocks for drawing " off the matters after treatment, and others for the discharge, " by distillation, of the ammoniacal gas when such an alkali " is made use of ;" the ammonia is condensed and will serve for a new operation. " The whole apparatus receives continuous " rotary motion from any suitable power during the steeping " operation, which motion is arrested on the termination of " the treatment, when the distillation of the ammonia com- " mences, and the contents of the cylinder are discharged. " The inner cylinder bears a certain number of vanes for " raising, dividing, or distributing the matters so as to con- " stantly change their position, while the whole is enclosed " with a nonconducting casing, the apparatus being charged " through the manhole."

[Printed, 8*d*. Drawings.]

A.D. 1865, October 21.—No. 2726.

WRIGHT, JAMES.—(*A communication from Eugene Porion.*) —"Improvements in the method of and apparatus for utilizing "the liquors used in the treatment of straw or other fibrous "materials for the manufacture of paper, which improvements "are also applicable to the evaporation of liquids generally."

First, "the economical recovery of the alkalies which have "been made use of" as above.

Second, "the construction, use, and application of an "apparatus for evaporating and carbonizing the said alkaline "and saline liquors." For this purpose using "a vessel or "chamber of convenient size and shape, the interior of which "is heated by furnaces or otherwise as most convenient, into "which vessel or chamber" "the alkaline or saline liquors to "be evaporated" are conducted. In the interior of this chamber are placed "one, two, or more spindles or shafts, "furnished with fans or blades; to these spindles a rotatory "motion is given, which has the effect of scattering the "alkalies or other liquors or lyes in the form of showers "or small drops, which are quickly evaporated by the heat "within the chamber. When the whole of the liquor is "evaporated, the alkaline matters deposited can be removed "from the floor of the chamber by means of openings in the "sides of the chamber, which are furnished with doors or "slides fitting perfectly water-tight." By these means the alkaline and saline matters are obtained, and can be used time after time with the addition of "a small quantity of alkali to "compensate for the slight loss by the necessary manipulations."

[Printed, 8*d*. Drawing.]

A.D. 1865, October 23.—No. 2741.

CLARK, WILLIAM.—(*A communication from Pierre Ernest Gégon and Charles Marie Gagnage.*)—"Improvements in "the manufacture of paper from marine vegetable matters."

First, "the primary purification of the material, by crushing "and pressure, so as to extract the salts contained in seaweed "and also the azoted organic matters, which may be used as "manure, the resulting fibre being used for the manufacture "of paper."

Second, "the gradual steeping of the material in order to "withdraw the greater part of the soda employed."

The seaweeds used "by preference are those known by the "names of fucus comosus (zostera maritima), especially the "varieties known as the fucus giganteus or fucus comosus of "the equator, a similar plant being used in Norway and the "north of Europe for roofing huts, as litter for packing fragile "articles, and other purposes. It is found in the form of long "glutinous coriaceous sheds or strips of a brownish-green "color, and when dry it in form presents somewhat the appear- "ance of tobacco." The wet seaweed is crushed by means of stampers, vertical mills, or crushing rollers, either grooved or otherwise; then placed in a hydraulic or other press, placed in pure water, and again pressed, and washed in plenty of water, and steeped in a "solution of carbonate of soda of a strength "of one-fifth to one-tenth per cent. (·001 to ·002);" after steeping it is again pressed and subjected to gradual washing, and then in plenty of water, and "bleached in the ordinary "way by means of gaseous chlorine and hypochlorites," and washed and drained. It may be made finer by again pounding. The seaweed is also treated by washing, steeping, milling, or crushing, &c.

[Printed, 4*d*. No Drawings.]

A.D. 1865, November 8.—No. 2882.

ERMEN, GODFREY ANTHONY.—(*A communication from Louis Horst.*)—"Improvements in treating vegetable fibres "used in the manufacture of paper and other similar sub- "stances made from pulp."

Producing "pulp for the making of paper, papier mâché, "paper board, and similar substances," from "straw, dried "grasses, seaweed, and other similar material," in "the "following manner, and according to the following formula "or thereabouts:"—To about 100 parts of straw or vegetable fibre, in pieces of about half an inch long, about 100 parts of muriatic acid are added, and, after steeping for about 18 hours, the straw is pressed and washed until no colouring matter comes from it, any acid in it being neutralized by mixing it with about five parts lime in sufficient water to cover the straw; afterwards boiling it for two or three hours with about 25 parts of caustic soda in sufficient water to cover the straw, then "washing the straw again until no free coloring matter " is eliminated," then mixing 40 parts of chloride of lime with sufficient water, putting the straw into the same, agitating them well together, and leaving them for two hours, after which 15 parts of sulphuric acid are gradually added to the last solution "in small quantities, stirring all continually." By this addition of acid "gypsum is formed in the pulp, " which is advantageous to the color and smoothness and " firmness of the paper," and after about four hours the pulp " may be pressed and freed from the liquor and used as ordi- " nary pulp."

[Printed, 4*d*. No Drawings.]

A.D. 1865, November 13.—No. 2922.

LAKE, WILLIAM ROBERT.—(*A communication from Charles Heaton.*)—(*Provisional protection only.*)—"An improved " method or process for producing paper maker's pulp from " cane, bamboo, and other analogous substances."

The other analogous substances are "wood, straw, and other " similar substances." The crude material cut in convenient " lengths is treated for about seven days with a weak solution " of caustic soda or other suitable alkali of about two degrees " Beaumé, contained in a vessel of the ordinary construction " for such purposes, heated by a steam coil or other convenient " apparatus." This softened material is passed through rolls like the ordinary press rolls, but "arranged to work somewhat " nearer together." The crushed material is run through a beater such as is used in a paper mill, water being used in the ordinary manner, by which the gummy portions are entirely removed. "The pulp is then subjected to a bleaching solution " of a strength of about two degrees Beaumé, which will im- " part a beautiful whiteness to the said pulp." "If a fine " grade of paper is desired" the pulp is boiled in an alkaline solution of about two degrees Beaumé from "one to four " hours, according to the purpose for which the paper is " required," and the pulp is passed through the grinding machine and into the paper engine. "When a common grade " of paper is being made, the last softening process may be " dispensed with, and the pulp taken direct to the grinding " engine."

[Printed, 4*d*. No Drawings.]

A.D. 1865, November 27.—No. 3041.

NEWTON, WILLIAM EDWARD. — (*A communication from Heinrich Voelter.*)—"Improved machinery to be used in the "manufacture of paper."

This invention is said to apply to "machinery for reducing "wood to pulp and working it into paper, cardboard, papier "mâché, and all other articles of paper." Also to the "refining and assorting of pulp by the wet process." It is stated that "the present invention consists of improvements upon "a process for which a Patent was granted," No. 3182, A.D. 1860. "The pulping apparatus is provided with an "iron rake for the purpose of taking hold of the largest "splinters and pieces of wood, in order that they may not be "carried against an additional frame situate on the opposite "side to the rake. The rake is cleared of the useful fibres by "a jet of water that is allowed to flow in the form of rain "from a pipe above. A projecting bar or trap, as well as an "additional sieve serves for assorting the fibres. One important improvement consists in the employment of wedges, "which facilitate the feeding forward of the wood to be "reduced or operated upon." "In the refining apparatus a "moveable basket is employed to sift, in order to retain the "larger parts of the mass that arrive from the pulper. This "basket is placed at the head of the vat in which the refining "cylinders work. In order to remove as far as possible from "the centre of the stones of the refining or grinding mills the "matters delivered by the cylinders which precede the apparatus, a small double shovel is adapted to the shaft of the "moving millstone."

"The improvements relating to the apparatus for receiving, "pulping, mixing, and assorting the fibres, have for their "object the better regulation of the speed and the progressive "motion of the material to be acted upon, and to determine "the better working of these apparatus in obtaining a regular "and quick manufacture. Rollers are also adapted to the "working cylinders in order to keep them constantly free from "the excess of fibres, and the rollers themselves are provided "with scrapers which clean them constantly. These apparatus "are also furnished with agitators, which aid the manipulation "of the material that is being operated upon."

[Printed, 1*s*. Drawing.]

A.D. 1865, November 29.—No. 3067.

BAKER, Charles Stuart.—(*A communication from Robert Hanham Collyer.*)—"Improvements in the process of treat-" ing materials for the manufacture of paper and other similar " textile fabrics, and in apparatus for the same."

First, "the employment of a preparatory recepient or re-" ceiver in which the materials," "such as straw from wheat, " oats, barley, or flax, flax waste, jute, cane, esparto, &c.," are " reduced in volume by the action of a strong concentrated " alkaline solution combined with hot agents." This is conducted in a "rotating receiver or vessel of three or four times " the cubic capacity of the finishing boiler."

Second, "removing the reduced material for the completion " of the alkaline treatment from the preparatory recipient or " receiver to another vessel, and subjecting it to high pressure " steam." This boiler rotates in the same manner as the first; there are "cocks to allow the steam used (after the " alkaline treatment is finished) to be used in reducing the " material," and there are cocks also "to draw off any excess " of liquor."

Third, "the extraction of the alkaline liquor by press rollers, " or with wire cloth in combination with the processes herein-" before described," with a view to the recovery of the alkali or other products by evaporation and incineration. A hopper receives the contents from the second boiler, in it is "a shaft " with arms or grooved roller to secure a regular distribution " of pulp and liquor to the wire band or cloth." This is carried between ordinary press rollers; "indian-rubber or " vulcanite have been used, as also a centrifugal extractor, " but these have not been found suitable."

Fourth, the combination of "apparatuses and processes."

[Printed, 8*d*. Drawing.]

[illegible]D. 1865, December 13.—No. 3219.

BR[illegible] ARD ARCHIBALD.—(*A communication from* *An*[illegible] —"The manufacture of pulp from Lygeum
" [illegible]

[illegible] ws with a cylindrical stem, in which there
" [illegible] t, the leaves are very long and possess
" [illegible] it is first boiled in a solution of caustic

alkali, then washed and triturated by means of the vats and rollers "used by paper makers or by other convenient " apparatus; it is next dried in the open air, or by steam or " otherwise, and bleached by any of the well-known means for " bleaching vegetable fibres."

[Printed, 4*d*. No Drawings.]

A.D. 1865, December 14.—No. 3245.

WEST, William Alfred.—"Improved apparatus for manu-" facturing paper pulp."

"Arranging a rotating boiler in a furnace, so that it may be " traversed to and from the same," so that it may move over racks and take a position over an adjacent tank, " into which it " may discharge its contents, and is then removed to its posi-" tion over the furnace to be re-charged." The boiler, which is spherical, constructed of plates of wrought iron rivetted together, is divided into four compartments with two manholes, which are in such a position that a line of the division plates will cut the centre of the manholes and their covers, while closing the boilers will fit against the division plates. The boiler is supported by two hollow trunnions, "which " allow of its rotating on its axis to disturb the charge, and " expose continually a fresh heating surface to the flame and " heated gases of the furnace." These trunnions have ports or passages so arranged that those of one trunnion will admit water or alkaline liquor by pipes to the boiler, and those of the other trunnion will admit steam. "The furnace is pro-" vided with a shield which closes the side or end of the " furnace next adjacent to the draining tank." This is suspended by a counter-balance chain to facilitate the rising and lowering of the shield to open or shut a passage for the boiler between the tank. "Upon the walls of the furnace are fixed " a pair of racks, into which gear a pair of pinions loose " on the trunnions, but capable of being fixed by means of " clutches when a traverse motion is required to be given to " the boiler." "Keyed to one trunnion is a worm wheel, " which gears into a horizontal worm shaft, that turns in " bearings affixed to the furnace wall, and receives rotary " motion, from any suitable prime mover. The rotation of " this shaft transmits a slow continuous rotary motion to the

" boiler, but when the spur pinions" are made fast it will also impart a transverse motion to the boiler, causing it to " move over the racks and thereby bring it over the adjacent " tank," into which it may discharge its contents, and is then removed to its position over the furnace to be recharged.

[Printed, 10*d*. Drawing.]

A.D. 1865, December 22.—No. 3318.

COOPER, JOHN ALEXANDER.—(*Provisional protection only.*) —"Improvements in the manufacture of yarns, string, and " paper, and in the preparation of dyes, and in dyeing fabrics " by the application of vegetable substances not hitherto used " for such purposes."

These improvements are, in reference to this subject, employing the stalks of the "French willow (epilobium)" in " manufacturing yarns, string, and paper." "The stalks of " these plants are peculiar in their structure; the layers of " which each stalk is for the most part composed are capable " of being freely stripped one from the other, and the " strippings are then readily separated into fibres by the " ordinary mechanical means of hackling, by which the long " fibres are obtained as when treating hemp and flax, and " the tow or short fibres may be further prepared by carding " and like machines. The long and short fibres thus obtained " may be spun as when using the fibres of hemp or flax of " like lengths. When used for making paper the fibrous parts " of the stalks are to be reduced into pulp in ordinary paper " engines as when reducing other vegetable fibres in the " preparation of pulp."

[Printed, 4*d*. No Drawings.]

1866.

A.D. 1866, January 4.—No. 35.

CLARK, WILLIAM.—(*A communication from Jean Baptiste Neyret, Zéphirin Gaspard Alexandre Nathan Petrone Orioli, and Amable Alfred Fredet.*)—(*Provisional protection only.*)

—"Improvements in preparing and treating wood and wood
" pulp for the manufacture of paper."

"Pouring on the pulp a mixture of chloride of lime and a
" suitable acid, hydrochloric acid for example, both dissolved
" in a suitable proportion of water; employing "an excess of
" the two reagents, otherwise they will, instead of bleaching
" the pulp, render it of a yellow tint." 1 part of chloride of
lime and 1 part of acid is generally "sufficient to bleach 100
" parts of pulp." To prevent wood stored turning brown,
" immediately after the wood is felled acidulated water is
" injected thereon, either by immersion or otherwise. This
" acidulated water should be prepared with any suitable acid,
" but preferably with hydrochloric."

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 9.—No. 69.

ANDERSON, William.—(*Provisional protection only.*)—
" Improvements in the mode of and apparatus for extracting
" liquor from macerate fibres employed in the manufacture of
" paper."

This invention relates to extracting the liquor used in boiling paper materials in a concentrated form for the purpose of subsequent treatment. After boiling the materials, "I let the
" stuff flow into a tank of sufficient capacity, provided with an
" agitator, and by means of a regulating valve or sluice I
" discharge the stuff on to a travelling endless web of wire,
" cloth, canvas, or felt, below which exhaust tubes may be
" applied if found desirable. A portion of the liquor being
" thus drained away, the stuff passes under a couch roller,
" which presses it into the form of a thick loosely-cohering
" sheet, which is then passed between a pair of pressing
" rollers. The sheet is then delivered on to a second endless
" web, and passing under one or more irrigating or sparging
" pipes over it, it is moistened with water or other hot or cold
" liquor, thence it passes between a second pair of rolls, and
" so on until, by alternate washing and expressing of the
" liquid, the desired degree of cleanliness has been attained.
" The liquor pressed out by each pair of rolls, and that
" drained from the endless webs, may be collected separately
" or not as may suit the particular case, and any waste stuff
" that may escape is caught by a filtering arrangement and

" again passed between the pressing rollers." The liquor is evaporated in pans, and "the 'stuff,' when the liquor is ex-" pressed therefrom, is ready for the bleaching stage of the " paper-making process."

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 15.—No. 140.

ROECKNER, Carl Heinrich. — "Improved machinery or " apparatus for the manufacture of paper pulp."

"In a hollow cylindrical or conical shaped vessel," adjust " a similarly shaped solid roller or hollow drum closed at its " ends, and mount the same suitably supported." Around this roller fix "a series of plates of metal," "equal dis-" tances asunder, say, 12 of the said plates the whole length " of the said roller or drum, radially from the centre thereof, " with their edges projecting an inch or more, then proceed " to fix 12 more plates between the spaces of the former " plates," about " one-fourth shorter than the former plates, " always keeping the ends of all the plates flush with the " largest end of the aforesaid roller or drum, and in like " manner I fix two more sets of plates, each set being about " one-fourth shorter than the other." In connection with the above hollow vessel, and "fixed into the upper part of the " opposite ends of the said vessel are two pipes, one leading " into a reservoir containing the materials to be operated upon " mixed with water, and the other pipe serving to discharge " the said materials after they have been sufficiently operated " upon." It is also proposed to adapt to the under part of the hollow vessel a box with three openings which correspond with three openings in the hollow vessel, each opening being fitted with wire gauze of different degrees of fineness. "To " each end, and as near as may be to the bottom of the afore-" said box, a pipe is fitted with a stop-cock for regulating the " influx and efflux of water into the said box from a reservoir " suitably placed," so as to carry off any sand, dirt, &c. from the materials under operation.

[Printed, 2*s*. 4*d*. Drawings.]

A.D. 1866, January 22.—No. 200.

PENNEY, Charles Gregory. — (*Provisional protection only.*)—" Improvements in the treatment and utilization of

" certain waste products resulting from the combustion of " boghead, cannel, and other coals and minerals, and from " the treatment of china clay and other analogous substances."

The coke formed by the combustion of any of the foregoing materials having been burnt in a suitably constructed furnace, the " residuum or compound ash, consisting mainly of silica " and alumina," can be used "for loading paper or cloths, " and also for the purposes of enamelling, and as pigments." The colour can be improved " by means of acids, either gaseous " or liquid," or the ash may be bleached " by means of the " ordinary agents and processes."

The ash may be " digested, boiled, or heated in sulphuric, " hydrochloric, or other mineral acid, or in acetic or any " analogous acid, or in any suitable mixture of such acids," and the residuum may be utilized as pigments, and for other purposes.

The refuse silica from china clay and substances of a like character " can also be utilized by adopting the above-" mentioned processes."

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 26.—No. 265.

SHERWOOD, Henry.— "Improvements in the means of " and apparatus for treating mixed fibrous substances in " order to obtain improved products therefrom; parts of " which means and apparatus are also applicable to various " useful purposes."

First, disaggregating "vegetable fibres or substances by " means of their exposure to gaseous sulphuric anhyride, " and to anhydrous chlorohydric gas, each used alone or " together, or in mixture with other gases, especially with " nitric oxide, nitrogen, hydrogen, or carbonic oxide."

Second, the combination of air-tight rollers "to receive " substances into an atmosphere of gases, and to deliver " them from it, with any known mechanical arrangement " applicable to receiving the substances from the entering " rollers, and delivering them to the issuing rollers."

Third, edulcorating fibrous substances by combining pairs of rollers, "fluted in any manner or plane, and with or " without a vertical or horizontal oscillating motion, between

" which the substances pass to a succeeding pair with a "·current of air or of liquid," or of both.

Fourth, separating fibrous substances from masses into fibres " by means of the combination of a swift having any form " of surface, with a "running nip," which "consists of one " or more rollers, or of an endless sheet running on rollers, " the surface of which the endless sheet or rollers travels " at about the same speed as the surface of the swift, and " in contact with it."

Fifth, loosening fibrous substances by means of skeleton swifts, whose surfaces consist solely of rods stretched from side to side, and which act the part of the swift in teazers and carders.

Sixth, submitting vegetable fibres to the action of known agents in closed cisterns under 100 degrees centigrade, but under pressure of air or of liquids. By the above means vegetable fibres are obtained available for paper pulp, &c., and the animal fibres for felting, &c.

[Printed, 10*d*. Drawing.]

A.D. 1866, February 2.—No. 332.

LARKIN, HENRY, and **PURKIS**, ROBERT.—"Improvements " in the manufacture of paper, by the employment of a " fibre not hitherto used in this manufacture."

The use of "fibre obtained from the roots of the malva " sylvestris, or common mallow, and the preparing the fibre " for the said manufacture by subjecting the said roots to " the processes of crushing, boiling, stripping, washing, " and squeezing."

[Printed, 4*d*. No Drawings.]

A.D. 1866, February 13.—No. 451.

DRAKE, SAMUEL.—(*Provisional protection only.*) — "Im- " provements in combining together surfaces of wood," as " in substitution of card or millboard."

Thin sheets of wood are saturated with glue size by passing through a trough and then between rollers, and dried on racks in chamber gradually heated from a low to a high temperature. In like manner saturate the sheet or sheets which are to form the central portion or interior of the combined sheets, and dry them in a chamber heated to a low temperature, and a sheet prepared as above is applied to each surface, "taking care "that the direction of the grain of the intermediate pieces "is transverse or diagonal to those next adjoining or outside." The combined sheets are now pressed between hot plates, in preference, of zinc, for about five hours, when they are placed in racks "so that currents of hot air may freely pass "around them." "In some cases, in place of or in addition "to wood for the interior surface, I employ canvas or other "cloth treated, as described, in relation to wood."

[Printed, 4*d*. No Drawings.]

A.D. 1866, February 16.—No. 501.

WHITEHEAD, James Heywood.—"This invention has for "its object improvements in the manufacture of endless cloths "suitable for use in paper making machinery and for other "purposes."

It is proposed to employ cloths of cotton, linen, or vegetable fibre woven in such manner that the warp is buried, the weft being as much as possible kept on the surface of the fabric. The joint for rendering each cloth endless is made by bringing together the ends from which the warp threads project, the weft having been removed for a short distance. The warp threads are drawn into the opposite ends of the fabric by a needle and are secured by tyeing each separate warp thread together in various parts, thick warp thread being used each composed of several smaller ones which are tied separately.

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 5.—No. 659.

MENNONS, Marc Antoine François.—(*A communication from Marie Anne Véronique Cauzique.*)—(*Provisional protection only.*)—"Improvements in the mode of converting the "fibrous residues of certain plants into filaments suitable for "the manufacture of textile fabrics, paper pulps, and other "products."

The object of this invention is to convert the fibrous residues of certain plants, such as hemp, flax, nettles, broom, or China grass, into filaments suitable for the manufacture of textile fabrics including tissues, waddings, lint, paper pulps, "and " other materials of like nature." To this end "the roots and " other fibrous residues of the ordinary hackling, combing, " carding, or spinning processes are first submitted to the " action of any suitable devilling or opening machinery, from " which they issue in regular filaments. The product thus " obtained is then cleansed by a lye composed of about equal " parts of ox gall and refractory clay, followed in some cases " by an acidulated bath, and, being finally bleached by the " action of any suitable chloride, is washed and dried for " use."

[Printed, *4d.* No Drawings.]

A.D. 1866, March 5.—No. 672.

NEWTON, Alfred Vincent.—(*A communication from John Jordan Eckel, Isaac Smith Schuyler, and James Waring Gillies.*)—(*Provisional protection only.*) — " An improved " process of bleaching."

This invention, "is applicable to the bleaching of fibrous sub" stances and fabrics manufactured therefrom, but it is more " especially designed for bleaching straw, and flax, and hemp " fibre for paper stock." The fibre or fabric is first washed in a solution of about thirty-six gallons of water, to which is added 10 lbs. of caustic soda or potash, and 3 lbs. of chloride of sodium (salt), or an equivalent amount of ox gall. The stock is boiled in the liquid for about thirty minutes, the liquid is expressed, and saved for repeated use, and the stock washed in clean or pure water. " The bleaching is effected as follows :—To thirty" six gallons of water add of chloride of lime about 15 lbs., " and of sulphuric acid about 18 oz. The acid is to be added " gradually. The bleaching liquid is to be well stirred, and " the cleansed stock or fibre placed therein in small quantities " at a time, say twenty pounds of the stock or fibre being kept " submerged." Hydrochloric and other acids may be used in place of sulphuric acid, "and for the alkali wash liquid " potassa may be used instead of the caustic soda, and spirits " of ammonia instead of the spirits of wine," about in the same proportion. " The liquid potassa admits of the solution being

" used cold," and is a saving "in time and avoiding the " expense of furnaces and boilers."

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 19.—No. 812.

ROUTLEDGE, Thomas, **RICHARDSON**, Thomas, and **RICHARDSON**, William Henry.—"Improvements in treat" ing the waste liquors resulting from the preparation of " esparto grass, alfa, straw, and other fibrous substances, and " in purifying the alkali recovered therefrom, and in furnaces " or evaporating pans connected therewith."

The above-mentioned liquors are run while hot, when practicable, into reservoirs or pans, and evaporated in a reverberatory or other furnace, so as to burn off the organic matter wholly or in part. The red hot mass is drawn from the furnace and exposed to the air, and if carbon is still present, it may be further heated "in a carbonating furnace until all or nearly all the " carbon is consumed, and a 'white ash' obtained." Or, instead of proceeding as above, the organic matter in the mass is merely charred, and thus rendered insoluble in water, and the residue digested in water, and the solution boiled down to dryness or mixed with lime for subsequent treatment hereinafter described. The ashes thus obtained are mixed with quicklime, ground together, heated in a furnace until a portion or all of the acids from the soda salts are evolved, or the ash is dissolved in water and the lime slacked with this solution. The resulting materials are lixiviated with water, and the liquor so obtained can be employed. These operations are conducted in ordinary pans and furnaces, or in a furnace consisting "of two beds separated by a bridge, the one nearest " the fire being devoted to the treatment of the materials with " lime when necessary, while the other is used for burning " off the organic matter." The bridges are all made hollow, with openings to admit air. At the end of the furnace is a pan, built so as to allow the products of combustion from the fire-grates and from the burning of the organic matter to pass over the liquor with which it is filled. Above this pan an iron pan is erected, and the combustion products pass beneath it through a flue, and thence over the liquor in it. Above this again may be placed a third pan or reservoir, into which the waste liquors may be run.

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 23.—No. 863.

AMOS, Charles Edwards, and ANDERSON, William.—
" An improved mode of treating waste liquors for the dissi-
" pating or utilizing of the same."

The waste liquors from " treating straw, grass, and other fibres " preparatory to their conversion into paper, but it is also ap- " plicable to the treatment of other waste liquors," are gradually admitted on to the top of burning fuel in a furnace similar to a blast furnace, "keeping up a supply of air by means of " tuyers as long as the discharge of liquor on to the burning " fuel is continued." The water is driven off, and the alkali collecting at the bottom of the furnace is drawn out from time to time. "In case it is desired to use the steam generated as a " motive power, or for heating purposes, the process must be " carried on under presure in a closed furnace, the air being " forced in through the tuyers at a proportionately increased " pressure, and the fuel let down through the usual arrange- " ment of double valves or traps." When coke is the fuel used, " the residuum is chiefly sulphate of soda. In order to obtain " the carbonate, which is the material we employ in the process " of boiling the straw, we propose to add to the black or waste " liquor, before admitting it to the furnace, chalk or whiting, " in proportion equivalent to the strength of the alkaline " liquor; a residuum of carbonate of soda will thus be ob- " tained."

[Printed, 8*d*. Drawing.]

A.D. 1866, March 31.—No. 925.

JOHNSON, John Henry.—(*A communication from Justin Henry David.*)—(*Provisional protection only.*)—" Improve-
" ments in bleaching books, engravings, paper, cotton, and
" other similar articles and substances."

These improvements are, " as applied to books for example," " placing them in their entire state, and without the necessity " even for opening the leaves, in a closed chamber, by pre- " ference of glass, into which chamber chlorine gas obtained " in the well-known manner is introduced " for " about " 8 hours, which has the effect of restoring their white " appearance." They are then removed from this chamber and placed in another, and " left for about 24 hours under " the action of ozone," " obtained by placing in a leaden "dish a small quantity of water, in which pieces of phos-"phorous (previously treated by immersing them in boiling "water for 12 hours) are introduced," which "insures their "non-ignition at considerably higher temperatures than "would be necessary to ignite the same substance in its "ordinary condition." The ozone is produced by passing a current of air over the prepared phosphorus, and "the air "thus charged with ozone is directed into the chamber with "the books to be bleached, and which have already been sub-"mitted to the action of chlorine gas." Other means may be used "for preparing ozone, as for example, by the aid of a "solution" of 2 parts by weight of peroxide of manganese and of chlorate of potash, 4 parts by weight of water, and passing through the same a current of carbonic acid gas "until "the liquid crystallizes and assumes a deep red tint; these "crystals are then brought in contact with six parts by weight "of sulphuric acid, whereupon they discharge ozone in large "quantities." A good result may be obtained by having an intermediate bath of sulphuretted hydrogen. Where a very white color is not required, ozone may alone be used.

[Printed, 4*d*. No Drawings.]

A.D. 1866, April 3.—No. 953.

PRENTICE, EUSTACE CAREY.—"Improvements in preparing "and treating gun cotton."

These improvements are, in reference to this subject, "making of paper or paper stuff or material of mixtures or "combinations of converted fibre (pyroxylin) and inert fibre." By preference, such reduction into pulp is performed on the fibres after they have been mixed, or during the mixing of them in the desired proportions, but the converted fibres and the unconverted fibres may be separately reduced into pulp and then beaten and mixed together in the desired proportions, and the mixed pulp may then be made into paper or paper stuff, the object being to retard its burning when it is used as an explosive compound.

[Printed, 4*d*. No Drawings.]

A.D. 1866, April 9.—No. 1009.

WEATHERDON, BALDWIN FULFORD.—(*A communication from Jeane Pierre Caminade.*)—"Improvements in treating

" lucern root for paper-making and weaving purposes, as " well as in abstracting soda salts and coloring matters " therefrom."

According to this invention, the roots of the lucern plant are crushed between rollers in order to expel the sap therefrom, and are then dried, and are next " submitted to any retting or " macerating process in like manner to hemp and flax, for " the purpose of disintegrating heterogenous substances," the fibrous parts thus obtained being then bleached in the usual way and used for spinning, weaving, and paper-making purposes."

The inventor states that in the manufacture of paper he reduces the root " from its natural state to the half stuff" by passing it " through the rollers aforesaid, by means of an endless chain and hopper, direct to the root washer, which " receives it down an inclined plain, thereby allowing the " same to be cleansed or washed in its passage through the " apparatus ;" and that he prefers to effect the pounding and pulping by the employment of " vertical millstones," by which the filaments or fibrous portions of the material " are more " effectually preserved and rendered larger and heavier."

Soda salts or kelp, picric acid, and "a new coloring matter " called luzerine, from which green and yellow colours are " produced," are obtained "by treating the said roots and " setting them in boiling water heated by steam," and " successively evaporating the washing waters."

[Printed, 4*d*. No Drawings.]

A.D. 1866, April 9.—No. 1010.

BAUWENS, Felix Lievin.—(*Provisional protection only.*) —" An improved process for recovering cotton waste and " similar matters after they have been soiled in cleaning " machinery or otherwise."

" I take for instance, one hundredweight of dirty cotton waste " or other fibrous material, and add thereto about 25 per cent. " of oily or fatty matter or other dissolvent, such as paraffin or " turpentine oil in a warm or hot state, and when well mixed " by stirring I place the whole is a vessel with boiling water, " and stir it till it is thoroughly soaked," and press it while still hot in a screw press or otherwise. The pressed material is then put into a weak caustic soda ley, and warmed to about boiling point, or the hot ley is poured over the material, and the material is finally washed in warm water with a little soda, when it is wrung, dried, and beaten. "Further, lye baths, " and even acid and chlorine baths may be given to the ma- " terial, if required to be whiter for paper-making. If the " material is to be employed for paper-making, the beating " operation may be dispensed with."

[Printed, 4*d*. No Drawings.]

A.D. 1866, April 26.—No. 1176.

PARAF, ALFRED. — (*Provisional protection only.*)—" Im- " provements in printing and finishing all materials where " ultramarine colors are used."

" Preventing the ultramarine colors being destroyed by acids, " acid salts, or other bodies" when " used for tinting in blue " papers," by introducing in the finish" or in " the ultramarine " color," " sacharates of the alkalies, using, by preference, " sacharate of lime," which " not only neutralizes the acids " but also prevents oxydation and fermentation." The quantity " of the sacharate" varies according to the quantity of acid or acid salts in the finish or color but " from 5 to 12 or 15 per " cent. may be used."

[Printed, 4*d*. No Drawings.]

A.D. 1866, May 23.—No. 1444.

ROWAN, WILLIAM.—(*Provisional protection only.*)—" Im- " provements in machinery for preparing and cleaning flax, " tow, hemp, cotton, shoddy, and other materials employed " in textile manufactures, and in the manufacture of paper."

This invention consists, firstly, in the employment, in lieu of the ordinary pointed needles or pins used in carding engines and other machines for preparing fibres, of pins " with round " heads similar to knitting pin heads, and also of centrifugal " pins attached to the revolving cylinder; these pins heads " and pins enter the fibre under treatment, and act upon it in " a more efficient manner than the ordinary pointed pins or " needles."

Secondly, " in fitting fan blades to the arms of the revolving " cylinder which carries the pins or other appliances to act

" upon the fibres; these blades revolve with the cylinder and " produce a blast which cleans the fibres of dust and other " loose matters; the cylinder is perforated, or of a skeleton " form, to allow the blast to pass through it."

[Printed, 4*d*. No Drawings.]

A.D. 1866, May 23.—No. 1450.

LONGBOTTOM, JOHN, and EASTWOOD, JAMES.—" Im" provements in the mode or method of applying heat in the " drying and calendering of yarns, textile fabrics, and other " materials, and in the heating and evaporating of liquids, " and in the apparatus employed therein."

These improvements are, in reference to this subject, " the " enclosing of superheated water pipes in drums, cylinders, " boxes, or cases, and the application of such arrangement " to the drying of various textile fabrics, paper, and other " substances substantially " as follows:—The superheated water is " contained in strong hydraulic tubes coiled or " otherwise disposed, and placed in a furnace so as to " elevate to a high temperature, or superheat the water " contained in and circulating through such tubes." In applying these tubes they are introduced into the interior of hollow cylinders, boxes, &c., " near to or in contact with " which the materials to be dried are caused to pass, or the " materials to be dried are made to pass in direct contact " with or near to the superheated water tubes." In some cases these superheated water tubes are applied " to the " heating of air in any convenient chamber or receiver, from " which the highly heated air passes off to ordinary drying " cylinders for the purpose of heating the same, or to be " otherwise applied or used for the like purpose." The joints of these tubes are made with " a double conical soft brass, " copper, or other equivalent metal washer."

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1866, June 20.—No. 1654.

FYFFE, DAVID ADAM.—" Improvements in the manufacture " of pulp."

A quantity of sawdust is fed into a pair of millstones *and ground* as fine as possible, and the heat arising from the grinding is got rid of as speedily as possible by means of a fan or fans placed "connected by a pipe or duct "to a cross pipe, and from the cross pipe other pipes or "passages extend to the grindstone casing, the fan being put "in motion the heat currents caused by the grinding process "are got rid off." In addition to drawing off the heat as above, "a stream of water is admitted which passes in with "the sawdust as the latter is being ground, and when ground "this becomes at once converted into pulp." "The stone "which it is preferred to employ for grinding the sawdust is "that commercially known as the Newcastle gritstone."

[Printed, 10*d*. Drawing.]

A.D. 1866, July 11.—No. 1814.

WALKER, William.—"Improvements in and apparatus for "dressing or preparing for spinning hemp, flax, jute, manilla "hemp, and other fibrous materials, and for the conversion of "ropes and other cordage and textile fabrics into oakum, tow, "and paper stuff, dressing and cleaning 'waste tow,' wool, "hair, and other like 'waste' fibres."

First, "advancing and receding the gill bars at a right angle "to the axle of the driving shaft, and causing gill pins, or heckle "teeth, or knife blades to work direct through the openings of "the perforated plate, and throwing out the teeth by centrifugal force and controlling the action of the combing teeth, "or knife, or cutting blades mounted on reciprocating bars by "means of the circular or other suitably shaped stationary "races and guides."

Second, "combining the beaters and reciprocating gills" "on the two parallel driving shafts."

Third, "receiving the fibre as it is discharged from the "machine on a large sieve or netting, or other openwork plat "form or in a cylindrical conical shaped revolving sieve or on "an endless revolving band of net work."

Fourth, "dividing the feed table into channels or grooves for "preventing the yarns being entangled with each other as "they are drawn through the feed rollers."

Fifth, "the use of a plate or slab corrugated on the under "side in combination with an endless feed apron for preventing the yarns when being drawn over the table on the feed "apron being entangled."

Sixth, "the application and use of the reciprocating nipper " or fibre holder," and the system or "arrangement, combina- " tion, and construction of the various parts."

[Printed, 1*s*. Drawing.]

A.D. 1866, August 1.—No. 1980.

SAWYER, JOSEPH, and BAUMAN, FREDERICK.—"Improved " machinery or apparatus and processes for the manufacture " of paper pulp from wood and other fibrous materials."

This machinery consists of a cast-iron frame supported by standards or columns with a bed plate bolted to it, having two slots for holding the material lengthwise of the fibre, "two cast- " iron side plates fitted with racks and pinions or screws to " adjust, raise, or lower the top part, a table plate fitted with " friction rolls made of wood or iron; a groove of a V-shape " may be used for the table to travel on the above-named side " plates; the top part or table has a series of steel plates, fixed, " tempered to the degree of saw plates, and on one edge, or on " the end of the steel plates are formed the cutting points " known as the diamond point." The table may be put in motion by a crank or an eccentric lever, the points or cutters being attached to the table are put in motion at the same time; during this operation cold water is admitted amongst the fibre. It is also proposed "to make a roll or drum of wood or iron " with a spindle or shaft, through the lengthway of the roll " or drum, having bearings on which it will rotate at a speed " of 25 to 200 revolutions per minute. About the periphery " of the above-named roll or drum cutters are fixed, some " made of steel plates bevilled on the cutting edge, and others " with teeth similar to saw teeth; these cutters are arranged " alternately;" it is also proposed "to employ a frame fitted " with a sliding or moveable box, which is placed in front of " the aforesaid roll or drum; this roll or drum rotates on its " own axis horizontally, while the moveable box in front " thereof has a vertical motion imparted thereto." It is further proposed to reduce the fibre thus obtained into pulp by subjecting it to the action of warm or cold water, or both, also steam and alkali, during the process of beating, grinding, purifying, &c., and using a close vessel instead of an open one, *with an inlet* and outlet pipe for the pulp. The pulp thus

produced is good for general purposes, but is made finer by passing through any kind of mill with stones. The making of pulp is expedited by passing it through a muller or mill of the following description :—"We take a roll or drum of wood or
" other material, say six feet in diameter and six inches thick,
" on each side are perforated steel plates fixed securely by
" bolts, and a spindle put through the six-inch way of the roll
" with bearings for it to rotate on its own axis; an inside
" casing is made of steel plates, and an outer casing of frame-
" work for carrying the roll or drum made air-tight;" "the
" fibre may be fed in at the top of the frame, and the outlet
" be at the bottom; standing in a vertical position, steam will
" be admitted through the outer casing, and warm water to
" soften the pulp; the alkali will come into the purifyer,
" which is fitted with a strainer plate, allowing the refuse to
" pass off through the cylinder or rolls and then be crushed,
" so that there may not be the least waste."

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1866, August 16.—No. 2109.

ROLLS, DUDLEY. — (*Provisional protection only.*)—"Im-
" provements in the manufacture of envelopes, and of paper
" for making envelopes."

Making paper, "with straight watermark lines running
" diagonally or at an angle from side to side of the sheet
" of paper," and using such paper for making envelopes.
" The envelopes are cut at an angle in the same way as plain
" envelopes are cut, and the inclination at which the enve-
" lopes are cut corresponds with the inclination at which the
" watermark lines are produced on the paper, so that the
" one neutralizes the other; in this way envelopes with water-
" mark lines running horizontally are obtained without any
" but the ordinary waste, and a considerable economy in the
" manufacture results."

[Printed, 4*d.* No Drawings.]

A.D. 1866, August 22.—No. 2156.

HASELTINE, GEORGE.—(*A communication from Henry Jones, Duncan Farquharson, and Isaac Cowles Colton.*)—
" An improved process for bleaching with the aid of hydro-

" static and pneumatic pressure, conjointly or separately,
" wood, straw, and other fibrous material for the manufacture
" of paper pulp, and for bleaching flax, hemp, thread, yarns,
" felts, cloths, and other fibrous and textile materials."

The stock ready for bleaching is put into a hollow cylinder (about two-thirds or three-quarters filled) which is tightly closed, and the bleaching liquor is forced into the cylinder by any pump until a pressure is obtained of about 120 lbs. to the square inch; the bleaching is perfect in about two hours, if at a higher pressure in less time. During the whole of the process, the cylinder should have a slow rotary motion, and it is also "recommended to place arms,
" brackets, or projecting pieces of wood or metal on the
" inner sides of the cylinder, which will prevent the stock
" from being massed together."

[Printed, 4*d*. No Drawings.]

A.D. 1866, August 30.—No. 2236.

MELLOR, JAMES MONTAGUE.—"Softening, disintegrating,
" and bleaching vegetable fibres."

This invention consists, first, in the use of "the combined
" solution of carbonate of soda, sal-soda, or other alkali and
" lime water, with and without the combined use of electricity
" or ozone," for the above purposes. The solution consists
" of carbonate of soda or sal soda or other alkali at from
" one to ten degrees Beaumé, and about an equal quantity
" of lime water, mixed together." The process may last from one to sixty hours "depending upon the nature of the fibre to be acted upon."

Second, in the use and application of electricity or of ozone,
" separately or in combination with any suitable substance,
" for softening, disintegrating and bleaching vegetable fibres."

[Printed, 4*d*. No Drawings.]

A.D. 1866, September 4.—No. 2269.

NELSON, EDWARD.—"Improvements in the mode of treating
" certain fibrous vegetable substances, so as to render them
" suitable for the manufacture of textile and other fabrics."

This invention relates to the treatment of the Spanish and *Alfa grass* (known commercially as "Esparto"), also India and China and other grasses, bamboo and other canes, the palm tree and its leaves, the bark of trees, wood, sawdust and shavings, wheat and other straws, and the stalks and leaves of other plants which contain fibre, hemp, flax, jute, Manilla fibre, cocoa-nut fibre and husks, seaweed, cotton and woollen rags, old floorcloth, tarpauling, tarred rope, and junk, for the purpose of obtaining therefrom fibres suitable for the manufacture of yarn for textile fabrics, as well as for the fabrication of ropes, paper, and other articles.

The invention is described at some length, but consists essentially in the treatment of the substances mentioned "with "argillaceous or oleaginous matter, either separately or com"bined, in conjunction with heat, applied by steam, either in "its simple or superheated state, or otherwise, by any other "convenient and suitable medium;" the inventor states that by these means he facilitates the removal of the siliceous and albuminous matter contained in the substances so treated in a manner which renders the fibres better adapted for manufacturing purposes than heretofore.

In treating fibres suitable for the manufacture of yarn, as well as for ropes, sacking and such like, the material is subjected to the influence of highly heated fixed fatty matters rich in stearic acid; the inventor states that some of the grasses yield up their objectionable coloring matter, and disintegrate as required, when boiled in oleaginous, vegetable, animal, and cetaceous matter "heated to a temperature below "the volatilizing point," the coloring matter being first brought into "a state to become saponified" by the use of an alkali, or of lime, in a caustic state, a carbonate being preferred for very fine fibres. After being thus treated the fibres are cleansed by the use of steam, or subjected to a "cold boil" in common soda of commerce, being next passed between rollers to further loosen and disintegrate them, and then heckled and boiled up in a "cold boil" with pure oil soap and carbonate of soda, being next rinsed in water and so rendered fit for bleaching. For this operation one pound of chloride of lime mixed with ten gallons of water may be used, the action of this mixture being strengthened by the addition of a small quantity of sulphuric acid.

In employing heated fatty matters, as mentioned above, such matters are first deprived of their glycerine, which may be effected either by saponification or acidification; the inventor states that the absence of glycerine renders the process more healthy for the workpeople.

In preparing the materials for paper making they are subjected to the action of steam in a suitable chamber, in which they are placed in layers, between which are interposed other layers of fire clay, or potter's clay, or alumina, or any of its natural or artificial compounds. When alumina is used boracic acid, or some substance of similar character, is employed to "flux the alumina with the silica, iron, and other foreign "matter in combination with the fibre," and so render such matter "miscible or soluble." The fibre is then passed through a beating engine and afterwards rinsed in water, being then steamed, and afterwards again beaten or passed between rollers. When in the beating engine any objectionable colouring matter may be removed from the fibre by the use of muriatic acid, the effect of the acid being suspended when necessary by sesqui-carbonate or carbonate of soda or lime. A press or rollers may now be used to extract the moisture from the material, the latter being then again steamed and subjected to the action of hot water in order to remove any remaining coloring matter, the material being then again pressed and bleached for use.

In preparing rough and coarse substances for the manufacture of rope, cordage, and similar articles, they are heated much in the same manner as the materials intended for paper making, the details of the invention being in all cases varied to suit particular circumstances.

[Printed, *4d.* No Drawings.]

A.D. 1866, September 12.—No. 2347.

AYDON, Enoch Harrison, and POCOCK, Ebenezer.—(*Provisional protection only.*)—"Improvements in machinery for "cutting rags, ropes, and other articles for paper making and "other purposes."

These improvements comprise "a series of circular knives "fixed upon and revolving with a shaft and kept at any re"quired distance apart by means of washers or distance pieces," "capable of being readily removed when it is required to "substitute others for them, so as to change the distances

" between the knives." Each knife is steadied at two or more points of its circumference by blocks of some material, " between which it works, and which assist also in maintaining " its edge." The rags, &c. to be cut, pass to the machine through "a hopper or sloping mouth, whereby they are " guided on to an endless web or belt between which and a " revolving fluted or roughened roller they are drawn on " ward to the knives, and after passing between them" "are " discharged from the machine." These machines may have duplicate hoppers and feeding arrangements, so that, if the materials are not cut fine enough, they may "by means of " the second hopper be passed between a different part of the " knives and thereby further divided." In these machines instead of circular knives band knives, guided and steadied, actuated as band knives ordinarily are, may be used. In other cases, instead of either circular or band knives, using " knives having a reciprocating motion imparted to them by " cranks or other equivalent means, and suitably guided and " steadied (by means of blocks or otherwise) at each side of " the part at which the cutting takes place."

[Printed, 4*d*. No Drawings.]

A.D. 1866, September 22.—No. 2445.

WANSBROUGH, ALFRED COLMER.—(*Provisional protection not allowed.*)—"Improvements in the manufacture of paper."

In lieu of adding to the paper pulp, before it passes to the paper-making machine, a size made from rosin, employing "a size obtained by boiling sea-weed, by this means the " quality of the paper is improved and a considerable economy " results."

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 18.—No. 2698.

SIMPSON, WILLIAM.—"Improved machinery, apparatus, and " processes for preparing and treating vegetable fibres, to be " used as 'half-stuff' in the manufacture of paper, papier " mâché, and such like materials."

"A suitable framing supports the following parts :—A hori- " zontal trough for feeding the machine with fibre ; this

" trough contains three pairs of rollers, adjusted one above " the other, the three uppermost rollers being connected " together by a vibrating lever adjusted loosely upon the " axis of the centre roller outside of the aforesaid trough, " and the axes of this centre roller are connected by slings " to a weighted lever below for exerting pressure upon " the top set of feeding rollers." "The fibre passes from " the rollers down an incline over and across which a re- " volving drum is mounted, having cutters arranged and " disposed helically about its periphery," "the fibre then " passes over a sieve," and "is afterwards caught hold of " between rollers formed with spiral grooves around their " circumference in the direction of the length of the said " rollers;" "the fibre thus prepared passes into a receiver " beneath;" it is then put into a revolving boiler, the lids closed, alkaline liquor pumped in through the hollow axis, the revolving boiler is heated till the pressure gauge indicates from one to two hundred pounds to the square inch. The fibre is sufficiently acted upon in from two to three hours. To keep the fibre hot a steam pipe is connected with one or other of the ends of the boiler. The fibre is then removed to another revolving boiler, into which is pumped chlorine liquor " until the indicator of the pump registers a pressure of from " 50 to 70 pounds per square inch." The "half-stuff" is " now ready to be reduced to pulp."

[Printed, 10*d*. Drawing.]

A.D. 1866, October 23.—No. 2728.

JOHNSON, John Henry.—(*A communication from Richard Smith and Oliver Ellsworth.*)—" Improvements in machines " for making paper."

First, "the system or mode of regulating the temperature " of the drying cylinders of paper machines by the expansion " and contraction of the web or sheet of paper that is in " process of manufacture."

Second, "the mode of detaching the continuous sheet of " paper from the felt or endless apron by means of friction " rollers or their equivalents, for the purpose of making the " contraction and expansion of the paper, caused by its hygro- " metric condition, to operate on a steam valve or other

" mechanism that will admit or exclude heat from the drying " cylinders."

Third, "the employment of a roller turned by the sheet of " paper, and so supported that its vibratory or reciprocating " motion," caused by the increase or decrease " of the length " of the paper shall by means of suitable connecting rods or " their equivalents open or close a valve for the admission " or exclusion of steam or heated air."

Fourth, " the application and use of a roller so held or " supported by the paper that it is not in contact with the " 'felt' or endless apron that it will recede or change its " position when the sheet of paper is broken, and thus communicate motion to a shipper that disconnects the rods or " arms leading to the steam valve, thus causing it to retain " its position and prevent the drying cylinders from being " overheated during the time that the paper remains broken."

[Printed, 10*d*. Drawing.]

A.D. 1866, November 9.—No. 2924.

NEWTON, William Edward.—(*A communication from Benjamin Chew Tilghman.*)—"Improvements in treating " vegetable substances, chiefly applicable to the manufacture " of paper pulp and fibres."

This invention " consists in a process of treating wood, " esparto and other grasses, flax, hemp, straw, and other " vegetable substances which contain fibres, with a solution " of sulphurous acid in water, heated in a close vessel under ' a pressure sufficient to retain the acid gas until the intercellular or cementing matter existing between the fibres is " dissolved, either partially or wholly, as may be desired, " and a fibrous product is obtained suitable for the manufacture of paper pulp " or for textile purposes. " The " addition of sulphite or bisulphite of lime, or other suitable " base to the acid solution tends to make the fibrous product " of a white colour and more easily bleached."

The invention is described at considerable length. In operating upon wood (for example), the latter is first cut across the grain into slices, and then placed in an iron vessel lined with lead, and provided with a steam jacket, and certain pipes, valves, and other appendages thereto, the vessel being about two-thirds filled with the sliced wood and a mixture of sulphuric acid and water in which a quantity of sulphite of lime has been dissolved. Heat is then applied by admitting steam into the jacket, and water is afterwards forced into the upper part of the vessel, the chemical mixture being now allowed to escape from the lower part of the vessel into a tube lined with lead, in which it is boiled until the sulphurous acid gas is expelled, this gas being conveyed to a condenser so that it may be reused, a quantity of sulphite of lime being also deposited during the boiling, which may also be used again. The wood is then washed, and, if necessary, the operation may be repeated, and instead of driving off the sulphurous acid gas by boiling, it may be neutralized by the addition of hydrate of lime, forming sulphite of lime, which can be again used. The details of these arrangements may be varied, and pumps, stirrers, and other mechanical agents used to facilitate the process.

In the treatment of flax or other long fibred plants in order to obtain fibres suitable for being spun into yarn, the same system is adopted, but care must be taken that the operation be not prolonged too far, otherwise the fibres will be so far reduced in length as not to be fit for spinning. The inventor mentions that in such cases weak solutions of acid of about specific gravity of 1,002 to 1,004 having added thereto sulphate of lime sufficient to raise the specific gravity to 1,005 or 1,008 may be used, and that by this means the fibres of flax may be loosened and separated in about 4 hours. The strength of the solution used, however, as well as the form of the apparatus employed, may be varied to suit particular circumstances.

[Printed, 4*d*. No Drawings.]

A.D. 1866, November 28.—No. 3127.

BACKHOUSE, GEORGE.—(*Provisional protection only.*)—
" Improvements in machinery or apparatus for manufacturing
" cardboard or pasteboard."

These improvements consist " in applying pasting or adhesive " material to one surface of every sheet composing the paste- " board or cardboard, except the top or bottom sheet, and passing such sheets over a roller, by which they are brought

" in contact together; such partially combined sheets are then " passed between an endless apron or felt and a drum," and then "over one or more drying cylinders, round each " of which endless aprons or felts are stretched (the paste- " board or cardboard passing between such aprons or felts " and such cylinders), and for the purpose of glazing such " pasteboard or cardboard a calender may be situated in close " contact with the drying cylinder, and any ordinary cutting " apparatus may also be applied."

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 15.—No. 3299.

BERTRAM, George.—" Improvements in machinery or appa- " ratus to be used for the manufacture of paper."

This apparatus is " to supplant the ordinary beating engine or " other means for beating pulp at present in use," and it consists " of a hollow case of a truncated conic form, situated, by " preference, in an inverted vertical position; its upper and " lower ends are closed with suitable metallic covers, the bottom " cover also constituting the sole plate upon which the pulp " beating mechanism rests. The interior of the case is fitted " or provided with a series or set of knives, cutters, or disin- " tegrators, and in the interior of the truncated cone case a " correspondingly shaped grinder is caused to revolve by any " of the well known and ordinarily employed mechanism for " imparting rotation. This revolving conic grinder is also " provided with cutters or disintegrators all round its circum- " ference." " The spindle or shaft upon which the grinder is " carried passes through stuffing box bearings at the centre of " the upper and lower covers of the grinder case, and the " lower end of the spindle or shaft is carried by a footstep " bearing fitted on an adjustable lever, by raising or lowering " which the distance between the disintegrating edges of the " grinder and its case are regulated, and the degree of fineness " to which the pulp is reduced correspondingly regulated. " The conic case is provided at its upper end with a duct, " through which the half stuff is led in; another duct is also " provided at the lower end, through which the pulp is educed " as it is ground."

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1866, December 22.—No. 3378.

RHODES, Joseph, **RHODES**, William Sunderland, and **RHODES**, Josiah. —(*A communication from Joseph Maison.*)—(*Provisional protection only.*)—"Improvements " in rag-grinding machines."

It is said that the present fluted nipping rollers which receive the rags from the feed sheet and place them in contact with the spiked cylinder do not sufficiently do so, and these improvements are employing, "instead of the fluted " rollers, a pair of plain rollers, one of which is covered " with india-rubber or other elastic material," and applying " a knife or plate formed to fit to the surface of the non- " elastic roller, and also to the elastic one, in such manner " as to leave a tapering space betwixt for the rags to pass " through between them; and the edge of this knife or plate " is made to extend to or near the point of contact of the " last-named roller and the cylinder, or to a point where a " right line drawn through the centres of the same would " bisect their circumferences."

[Printed, 4*d*. No Drawings.]

APPENDIX.

A.D. 1803, November 31.—No. 2746.

CROSS, Robert, and **SOUTHWORTH**, Thomas.—"A mode " of heating such pans, vats, cisterns, and other vessels as are " required to be heated by fire and used for working steam " engines, and in the business of a calico printer, dyer, brewer, " paper maker, bleacher, salt maker, tanner, and other such " like trades, by which invention much expense will be saved, " not only in the fuel to be used in the heating such vessels, " but also in the constructing the vessels themselves."

Instead of applying the fire to these boilers, &c., as heretofore in general use under the boiler, and the flues *being on* the outside, the fire is to be put into the furnace in the inside of the boiler and surrounded with water, and the flues also, which flues may be carried once, twice, thrice, or more times inside of the boiler and surrounded with water. "The boilers may be made of wood, stone, brick, cast or "wrought iron, or any other material waterproof." Soot and light ashes accumulating within the furnace and flues are cleared away by water from a boiler above, and "the water "must be admitted into the chimney and flues by a valve or "inlet fixed in the cistern."

[Printed, 8*d.* Drawing.]

A.D. 1807, September 8.—No. 3071.

DODD, RALPH.—"Still or alembic with a refrigeratory worm "or condenser, and a piston and rod, for the use of distillers, "brewers, and other persons using the like machinery."

The apparatus is applied among other purposes for making paper pulp, it may be made of a cylindrical, square, or any other form, either of wood, copper, iron, or any other metal or composition of metals. "The furnace or fire flue, which "may be double or treble, runs through it, and are made "of incombustible materials. A wooden or metal frame is "inside; the vessel or apparatus is put in motion by a wheel "and pinion." On this is fixed a number "of cutters to be "made like scythes, sword blades, or any other convenient "figure" as well as on the sides of the vessel when of a cylindrical figure. "The materials for making the pulp to "be thrown into the same, with a necessary quantity of "fluid, and the cutters set to work till the pulp is made." This vessel may be worked with or without the fire flue passing through the same.

[Printed, 1*s.* 4*d.* Drawings. See Rolls Chapel Reports, 7th Report, p. 105.]

A.D. 1856, December 12.—No. 2957.

PEASE, HENRY, and **RICHARDSON**, THOMAS.—"Improve- "ments in the manufacture of compounds of alumina."

Mixing common salt or muriate of potash with china clay or other suitable aluminous material, and adding sulphuric acid so as to convert both the alumina and the muriate into sulphates. The muriatic acid set free is evaporated off, and the residue may be used in place of the ordinary crystalized alum in the manufacture of paper, or "for many "of the purposes for which alum is now used, or alum may "be prepared from it by lixiviating with water, and crystallizing in the ordinary manner." "Alum or coal shales, native, "calcined or exhausted, may be substituted in this process "for china clay, and the preparation of aluminous material "is increased according to the alumina contained in it "which is soluble in acids." When the shale is roasted in heaps the natural shale is mixed with "from ½ per cent. "and upwards of muriate potash previous to the formation "of the heap, and with or without the addition of natural "or factitious sulphurets of iron. The subsequent treatment "does not deviate from that in common practice." "When "the presence of iron is not objectionable as in the manufacture of brown paper," "sulphuric acid or acid sulphate of "iron obtained by weathering iron pyrites and any common "aluminous minerals, such as the shales already named, "or ordinary brick clay" are employed, "mixed with common "salt to the extent of 5 per cent., or more, which are boiled "together until the acid is neutralized, when the crude "muddy liquor is syphoned off and boiled down by steam "heat or otherwise," so that on cooling it becomes a solid mass, this is "hastened by adding a small quantity of ochre "or china clay finely ground."

[Printed, 4*d*. No Drawings.]

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Metallic powder. *See* Cardboard, millboard, &c.

Millboard. *See* Raw materials for making cardboard or pasteboard. *Also* other heads in which pasteboard is mentioned.

Mineral ashes. *See* Loading.

Moss. *See* Raw materials.

Moulds for manufacturing paper :
- Elliott, 7.
- Fourdrinier, 15.
- Didot, 19.
- Cameron, 21.
- Palmer, 28.
- Prince, 41.
- Amos, 55.
- Brewer and Smith, 78.
- Brown and Macintosh, 85.
- Sullivan, 102.
- Smith and Smith, 203.
- Granger, 276.
- Green, 343.
- Clark (*Jones*), 344.

Mulberry tree (fibrous parts of). *See* Raw materials.

Nettles. *See* Raw materials.

Nitric acid employed to pulp vegetable fibres :
- Farina, 84.
- Coupier and Mellier, 85.

Ox gall and clay, treating raw materials with ;
- Mennons (*Causique*), 431.

Packing paper, manufacture of :
- Haigh, 211.
- Stevens (*Pesieux, Masson, and Meillard*), 245.

Palm tree (fibres from). *See* Raw materials.

Paper and cardboard, methods of manufacture not described :
- Hildeyerd, 1.
- Burneby 1.
- Bladen, 1.
- Fuller, 1.
- Jackson, 2.

Paper and cardboard, &c.—*cont.*
- Briscoe, 2.
- Dupin, De Cardonels, De Gruchy, Regnautt, De May, and Shales, 2.
- Tizack, 2.
- Gifford, 2.
- Hutton, 3.
- Oliver, 3.
- Koops, 11.
- Guestiar, 27.
- Saunders, 49.
- Young, 53.
- Dowse, 70.
- Poole, 73.

Paper-board (middles). *See* Cardboard, millboard, &c.

Paper cloth, manufacture of :
- Chapman, 60.
- Harlow, 106.
- Evans, 109.
- Haigh, 211.
- Stevens (*Pesieux, Masson, and Meillard*), 245.
- Granger, 276.
- Cooke, 392.
- Cooke, 394.

Papier mâché, manufacture of. *See also* Substitutes for papier mâché :
- Materials for ;
  - Jones, 18.
  - Young, 35.
  - Saunders, 49.
  - Bielefeld, 82.
  - Brooman, 97.
  - Gray, 108.
  - Clift, 113.
  - Gillman, 113.
  - Wheeler and Bromhead, 116.
  - Rossiter and Bishop, 120.
  - Peterson, 123.
  - Martin and Martin, 135.
  - Plunkett and Bower, 139.
  - Collyer, 150.
  - Broad, 156.
  - Jennings, 161.
  - Collyer, 162.
  - Newton (*Voelter*), 162.
  - Hodge, 226.
  - Newton (*Voelter*), 266.
  - Deakin, 284.
  - Le Harivel, 291.
  - Fenton, 339.
  - Gedge (*Bardoux*), 346.
  - Le Harivel, 371.
  - Drew, 385.
  - Hathaway and Todd, 390.
  - Monckton, 416.
  - Newton (*Voelter*), 423.

- Papier mâché, manufacture of—*cont.*
  - Treating and moulding;
    - Clay, 3.
    - Ducrest, 4.
    - Brindley, 41.
    - Saunders, 49.
    - Tayler, 56.
    - Crampton and Haddan, 59.
    - Haddan, 63.
    - Brindley, 69.
    - Bielefeld, 69.
    - Bielefeld, 72.
    - Jennens, 75.
    - Brindley, 78.
    - Haddan, 82.
    - Souter and Worton, 83.
    - Onions and Bromhead, 101.
    - Healey and Allen, 146.
    - Brindley, 151.
    - White and Parlby, 175.
    - Haggett, 211.
    - Collyer, 238.
    - Tidcombe, 253.
    - Devlan, 272.
    - Granger, 276.
    - Knowles, 278.
    - Davenport and Cole, 304.
    - Bailey and Bailey, 308.
    - Clark (*Jones*), 344.
    - Simpson, 445.
- Parchment (vegetable):
  - Gaine, 101.
- Pasteboard manufactured by machinery:
  - Johnson, 155.
- Pasteboard. *See* Cardboard, millboard, &c.; Raw materials for making cardboard or pasteboard. *Also* other heads in which pasteboard is mentioned.
- Pasting machinery. *See* Cardboard, millboard, &c.
- Pearl hardening. *See* Loading, &c. (barytic sulphate; calcic sulphate, &c.).
- Phormium tenax (New Zealand flax). *See* Raw materials.
- Photographic paper:
  - Fontainemoreau, 105.
- Plantain tree (fibres from). *See* Raw materials.
- Porous surface (revolving) used to save waste material carried away by the overflow of water, in the manufacture of paper:
  - Goostrey, Hulme, and Hough, 129.
- Potatoe plant (stalks or stems). *See* Raw materials.
- Preventing copies or impressions being taken from paper:
  - By means of an alkaline salt, a cupric salt, and soap solution;
    - Glynn and Appel, 82.
- Printing, manufacture of special paper for:
  - By combining two webs;
    - Dickinson, 137.
  - By loading it with chalk;
    - Sholl, 185.
  - From which no impression can be taken:
    - Glynn and Appel, 82.
  - Thin paper laid thick over thick paper;
    - Dickinson, 23.
- Pulp. *See* Fibres, reducing; Rag engines.
- Purple paper, manufacture of:
  - Gifford, 2.
- Rag engines:
  - Bladen, 1.
  - Jackson, 2.
  - Tizack, 2.
  - Carpenter, 9.
  - Dodd, 16 (*Appendix*).
  - Bugden, 21.
  - Davey, 38.
  - Cooper, 46.
  - Craig, 52.
  - Bennett, 54.
  - Amos, 55.
  - Ingram, 57.
  - Wrigley, 60.
  - Brewer, 61.
  - Nash, 64.
  - Lightfoot, 83.
  - Callen and Onions, 84.
  - Brooman, 91.
  - Beauvais, 92.
  - Bertram, 92.
  - Curtis and Donkin, 100.
  - Onions and Bromhead, 101.
  - Bellford, 118.

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- Park, 133.
- Paterson, 142.
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- Nightingale, 167.
- Paisley and Bertram, 167.
- Galloway and Galloway, 188.
- Collyer, 208.
- Cox, 216.
- Grimshaw and Mason, 219.
- Clarke (*Jordan*), 255.
- Newton (*Voelter*), 266.
- Rhodes and Kemp, 280.
- De Wyldé (*Dupont*), 305.
- Bottomley, 306.
- Partington, 314.
- Park, 346.
- Lambert, 349.
- Ledger, 386.
- Duncan and Child, 391.
- Park, 405.
- Rowan, 437.
- Nelson, 442.
- Aydon and Pocock, 444.
- Bertram, 449.
- Rhodes, Rhodes, and Rhodes (*Maison*), 450.

Raw materials for making cardboard or pasteboard. *See also* **Raw materials for making paper :**
- Acacia tree ;
  - De Frontin, 131.
- Apples ;
  - Gedge (*Bardoux*), 346.
- Arrow, or water arrow (leaves of) ;
  - Guyardin, 117.
- Asparagus (stalks and stems) ;
  - Gedge (*Bardoux*), 346.
- Asphodel root ;
  - De la Bertoche, 126.
- Bagging ;
  - Rossiter and Bishop, 120.
- Banana (fibres from) ;
  - Jullion, 133.
  - Jullion, 134.
- Beet root ;
  - Johnson (*Bérenderf*), 131.
  - Plunkett and Bower, 139.
  - Astrop, 334.
  - Astrop, 338.
  - Gedge (*Bardoux*), 346.
- Bryonia ;
  - De Frontin, 131.
  - Aubril, 150.
- Canvas ;
  - Rossiter and Bishop, 120.

Raw materials for making cardboard or pastebord—*cont.*
- Clover ;
  - Plunkett, 166.
- Cordage ;
  - Bladen, 1.
- Cotton ;
  - Bladen, 1.
  - Crosley, 117.
  - Treuille and Traxler (*Olier*), 309.
  - Gedge (*Bardoux*), 346.
- Dung ;
  - Jones, 13.
  - Gedge (*Burdoux*), 346.
- Elm ;
  - Fenton, 339.
  - Gedge (*Bardoux*), 346.
- Esparto ;
  - Berry, 51.
  - Le Harivel, 371.
- Ferns ;
  - Gedge (*Baraoux*), 346.
- Flags, bass or bast ;
  - Wheeler and Bromhead, 116.
  - Jullion, 133.
  - Astrop, 338.
- Flax ;
  - Bladen, 1.
  - Jones, 13.
  - Bargnano, 98.
  - Broad, 156.
  - Gedge (*Bardoux*), 346.
- Grain ;
  - Wilkinson, 91.
- Grass (green) ;
  - Clift, 118.
  - Coupland, 115.
  - Pariset, 139.
  - Drew, 385.
- Hay ;
  - Clift, 113.
  - Castelain, 122.
  - Pariset, 139.
  - Gedge (*Burdoux*), 346.
- Hemp ;
  - Bladen, 1.
  - Bargnano, 98.
  - Gedge (*Bardoux*), 346.
  - Monckton, 416.
- Hops (bines or stems) ;
  - Balmanno, 46.
  - Barling, 106.
  - Taylor, 114.
  - Broad, 156.
  - Plunkett, 166.
  - Brooman (*Picard*), 282.
  - Brooman (*Picard*), 295.

Raw materials for making cardboard or pasteboard—*cont.*

- Hops (refuse);
  - Sheldon, 64.
  - Crosley, 117.
  - Hodge, 226.
- Horse radish (leaves);
  - Thatcher, 113.
- Jerusalem artichokes;
  - De Frontin, 131.
- Leather;
  - Hooper, 5.
  - Bielefeld, 69.
  - Trappes, 116.
  - Trappes, 127.
  - Van den Hout and Brown, 140.
  - Van den Hout, 144.
- Leaves of plants;
  - Balmanno, 46.
  - Warner, 99.
  - Vivien, 101.
- Leeks;
  - Gedge (*Bardoux*), 346.
- Lilies (roots of);
  - Gedge (*Bardoux*), 346.
- Lime tree (bark of);
  - Fenton, 339.
- Linen;
  - Bladen, 1.
- Maize;
  - Coupier, 178.
  - Gedge (*Bardoux*), 346.
- Mangold wurzel;
  - Young, 35.
  - Plunkett and Bower, 139.
  - Astrop, 334.
  - Astrop, 338.
- Moss;
  - Bellford, 123.
  - Drew, 385.
- Nettles;
  - Clift, 113.
  - Henry (*Vasseur and Houbigant*), 187.
- Palm tree (fibres from);
  - Warner, 99.
  - Chauchard, 140.
  - Coupier, 178.
- Plantain tree (fibres from);
  - Jullion, 133.
  - Jullion, 134.
- Poplar tree (bark of);
  - Fenton, 339.
  - Gedge (*Bardoux*), 346.
- Potatoe plant (stalks or stems);
  - Balmanno, 46.
  - Mennons (*Millot*), 315.
  - Sellars, 336.
  - Gedge (*Bardoux*), 346.
- Rope shakings;
  - Rossiter and Bishop, 120.

Raw materials for making cardboard or pasteboard—*cont.*

- Rushes or reeds;
  - Chauchard, 140.
  - Coupier, 178.
  - Astrop, 338.
  - Gedge (*Bardoux*), 346.
- Sea tree mallow;
  - Peterson, 123.
  - Plunkett, 166.
- Seaweed;
  - Courtais and Jammet, 269.
  - Mennons (*Nuewens*), 282.
- Silk;
  - Bladen, 1.
- Straw;
  - Castelain, 122.
  - Chauchard, 140.
  - Broad, 156.
  - Coupier, 178.
  - Gedge (*Bardoux*), 346.
  - Ermen (*Horst*), 421.
- Sugar cane;
  - Jullion, 133.
  - Jullion, 134.
- Tan;
  - Henry (*Vasseur and Houbigant*), 187.
- Tan (refuse);
  - Crosley, 117.
  - Rossiter and Bishop, 120.
  - Horton and Horton, 148.
  - Fenton, 339.
  - Hathaway and Todd, 390.
- Thistles;
  - Bellford, 123.
  - Gedge (*Bardoux*), 346.
- Tow;
  - Rossiter and Bishop, 120.
- Turf;
  - Ley, 89.
  - Westerman, 90.
  - Clarke, 95.
- Turnips (root fibres of);
  - Astrop, 334.
  - Astrop, 338.
- Various other plants and vegetable fibres;
  - De Frontin, 131.
  - Plunkett and Bower, 139.
  - Henry (*Vasseur and Houbigant*), 187.
  - Astrop, 334.
  - Astrop, 338.
  - Fenton, 339.
  - Gedge (*Bardoux*), 346.
- Weeds;
  - Pariset, 139.
  - Chauchard, 140.
- Willow (fibrous parts of);
  - Fenton, 339.
  - Gedge (*Bardoux*), 346.

Raw materials for making cardboard or pasteboard—*cont.*
- Wood;
  - Desgrand, 45.
  - Balmanno, 46.
  - Brooman, 97.
  - Gray, 103.
  - Chauchard, 140.
  - Amyot, 148.
  - Newton (*Voelter*), 162.
  - Poisat, 168.
  - Yates, 201.
  - Newton (*Voelter*), 266.
  - Le Harivel, 291.
  - Gedge (*Bardoux*), 346.
  - Le Harivel, 371.
  - Newton (*Voelter*), 423.
- Woollen materials;
  - Bladen, 1.
  - Crosley, 117.
  - Barnwell and Rollason, 258.

Raw materials for making paper:
- Acacia tree;
  - De Frontin, 131.
  - Vautier, 284.
- Aloe, leaves and stalks of;
  - Berry, 44.
  - D'Harcourt, 45.
  - Small, 47.
  - May, 86.
  - Johnson, 125.
  - Burke, 133.
  - Burke, 135.
  - Wicks and Ghislin, 159.
  - Stevens ((*Helenus*), 246.
  - Mennons (*Carteron*), 296.
- Amaryllidaceous plants;
  - Ghislin, 338.
- Apples;
  - Gedge (*Bardoux*), 346.
- Arrow, or water arrow (leaves of);
  - Guyardin, 117.
- Asbestos;
  - Maniere, 98.
- Asparagus (stalks and stems);
  - D'Harcourt, 45.
  - Johnson, 125.
  - Gedge (*Bardoux*), 346.
- Asphodel root;
  - De la Bertoche, 126.
  - Brooman (*De la Bertoche*), 137.
- Bagging;
  - Rossiter and Bishop, 120.
  - Smith and Hollingworth, 126.
  - Wheeler, 255.
- Bambusa plants;
  - Lichtenstadt, 208.

Raw materials for making paper—*cont.*
- Banana (fibres from);
  - Berry, 44.
  - Small, 47.
  - May, 86.
  - Lilley, 104.
  - Jullion, 133.
  - Burke, 133.
  - Jullion, 134.
  - Burke, 135.
  - Hook, 154.
  - Mennons (*Carteron*), 296.
- Beans (leaves and stalks);
  - D'Harcourt, 45.
  - Brooman, 128.
  - Gedge (*Bardoux*), 346.
- Beet root;
  - Johnson (*Bérendorf*), 131.
  - Plunkett and Bower, 139.
  - Collyer, 150.
  - Cowley, 158.
  - Collyer, 162.
  - Johnson (*De Cassan and Meyer*), 294.
  - Johnson (*Mollet*), 313.
  - Reed, 317.
  - Vautier, 324.
  - Astrop, 334.
  - Ghislin, 334.
  - Astrop, 338.
  - Gedge (*Bardoux*), 346.
  - Accarain, 367.
- Birch tree;
  - Hope (*Smith late Woolrich*), 157.
- Bombax Malabaricum;
  - Mendel, 415.
- Brazilian grass:
  - Evans, 107.
- Broom plant;
  - Poole, 66.
  - Farina, 84.
  - Murdoch, 102.
  - Prevet, 102.
  - Johnson, 125.
  - Niven, 128.
  - Rennel, 263.
  - Johnson (*Gagnage*), 273.
  - De la Provotais, 291.
  - Clark (*Deplanque*), 351.
  - Brooman (*Baud and Delamarre*), 361.
- Bryonia;
  - De Frontin, 131.
  - Aubril, 150.
  - Ghislin, 334.
- Burdock;
  - Plunkett and Bower, 139.
- Cabbages;
  - Gedge (*Bardoux*), 346.
- Canvas;
  - Rossiter and Bishop, 120.
  - Williams, 406.

Raw materials for making paper—*cont.*

Carrots;
  Astrop, 334.
  Astrop, 338.
Chicory;
  Acland, 109.
  Jennings, 232.
  Astrop, 334.
  Astrop, 338.
Cisca;
  Stärck (*Carter*), 369.
Citron, orange, and lemon trees;
  Brown, 218.
Clover;
  Holt and Forster, 110.
  Coupland, 115.
  Johnson, 125.
  Plunkett, 166.
Cocoa-nut;
  Diaper, 122.
  Penney, 227.
  Astrop, 338.
Cocoa-nut husks;
  Newton, 89.
Coltsfoot;
  Plunkett and Bower, 139.
Coniferæ (fir trees);
  Johnson, 125.
  Moll, 136.
  Johnson (*Gagnage*), 273.
  Vautier, 324.
Convolvuli, bind-weed and "cissus" family of plants;
  Brooman, 63.
  Johnson, 125.
Cordage;
  Bladen, 1.
  Ronald, 369.
Cotton;
  Bladen, 1.
  Bugden, 21.
  Williams, 36.
  Coupier and Mellier, 85.
  Crosley, 117.
  Jullion, 124.
  Moll, 136.
  Siblet, 158.
  Crowther, 204.
  Holden, 227.
  Collyer, 233.
  Collyer, 238.
  Hartmann, 242.
  Jaille, 295.
  Treuille and Traxler (*Olier*), 309.
  Gedge (*Bardoux*), 346.
  Arrott, 353.
  Gray, 368.
  Bousfield (*Meucci*), 407.
  Bauwens, 436.
  Rowan, 437.
  Nelson, 442.

Raw materials for making paper—*cont.*

Couch grass;
  Crosley, 117.
  Jeyes, 104.
Dogs-grass;
  Gilbee, 136.
Dung;
  Zander, 49.
  Hill, 119.
  Astrop, 338.
  Gedge (*Bardoux*), 346.
Elm;
  Kelk, 136.
  Niven, 143.
  Vautier, 284.
  Fenton, 339.
  Gedge (*Bardoux*), 346.
Esparto, Diss and Spanish grass;
  Berry, 51.
  Dehau, 94.
  Messager-Abit, 146.
  Routledge, 147.
  Luis, 186.
  Brooman (*Morel*), 192.
  Routledge, 231.
  Hillel, 239.
  Steveus (*Helenus*), 246.
  Vautier, 284.
  Routledge, 296.
  Mennons (*Carteron*), 296.
  Clark (*Siry*), 312.
  Baggs and Simpson, 319.
  Vautier, 324.
  Ghislin, 334.
  Carbonell, 335.
  Richardson and Irvine, 350.
  Rideout, 360.
  Fenton, 366.
  Le Harivel, 371.
  Womersley, 383.
  Routledge and Richardson, 404.
  Collyer, 410.
  Routledge and Richardson, 411.
  Baker (*Collyer*), 424.
  Brooman (*Escubos*), 424.
  Routledge, Richardson, and Richardson, 433.
  Nelson, 442.
  Newton (*Tilghman*), 447.
Ferns;
  Coupland, 115.
  Johnson, 125.
  Brown, 128.
  Mennons (*Carteron*), 296.
  Gedge (*Bardoux*), 346.
Fibrous parts of fishes;
  Jennings, 205.
Fig tree (fibres from);
  Berry, 44.
  Small, 47.
  Ghislin, 334.

Raw materials for making paper—*cont.*
  Flags, bass or bast;
    Wheeler and Bromhead, 116.
    Hill, 119.
    Johnson, 125.
    Jullion, 133.
    Plunkett and Bower, 139.
    Ruck and Touche, 145.
    Touche, 156.
    Touche, 174.
    Astrop, 338.
    Gedge (*Bardoux*), 346.
  Flax (New Zealand and common);
    Bladen, 1.
    Koops, 11.
    Ball, 23.
    De la Garde, 27.
    De la Garde, 27.
    Gibbs, 36.
    Berry, 44.
    Gibbs, 53.
    Coupier and Mellier, 85.
    Pownall, 86.
    Collins, 95.
    Bargnano, 98.
    Jackson, 107.
    Gillman, 113.
    Coupland, 115.
    Helin, 120.
    Siblet, 158.
    Gibbs, 169.
    Wheeler, 170.
    Collyer, 208.
    Grimshaw and Mason, 219.
    Collyer, 233.
    Wheeler, 255.
    Dahmen, 264.
    Vautier, 284.
    Gray, 292.
    Jaille, 295.
    Fenton, 301.
    Henry (*Vasseur and Janssens*), 326.
    Gedge (*Bardoux*), 346.
    Gray, 350.
    Arrott, 353.
    Fenton, 366.
    Brunel, 379.
    Collyer, 410.
    Baker (*Collyer*), 424.
    Mennons (*Cauzique*), 431.
    Newton (*Eckel, Schuyler, and Gillies*), 432.
    Rowan, 437.
    Walker, 439.
    Haseltine (*Jones, Farquharson and Colton*), 441.
    Nelson, 442.
    Newton (*Tilghman*), 447.
  Furze;
    Coupland, 115.
    Johnson, 125.
    Niven, 128.
    Southby, 256.

Raw materials for making paper—*cont.*
  Galingale (the fibres of the cyperus longus);
    Hoskins, 118.
  Genital parts of bulls;
    St. Cyr, Grignon, and Rome, 267.
  Giagia;
    Gillman, 113.
  Grain;
    Wilkinson, 91.
    Johnson, 125.
    Siblet, 158.
    Jennings, 161.
    Slack, 171.
    Brooman (*Javal*), 229.
    Doffegnies, 268.
    Dart, 287.
    Willis, 308.
    Ghislin, 334.
    Gedge (*Bardoux*), 346.
  Grass (green);
    Stiff, 91.
    Holt and Forster, 110.
    Clift, 113.
    Coupland, 115.
    Johnson, 125.
    Fraser, 137.
    Pariset, 139.
    Spooner, 160.
    Galloway and Galloway, 188.
    Bonelli (*Manzoni*), 251.
    Rennel, 263.
    Johnson (*Mollet*), 313.
    Vautier, 324.
    Drew, 385.
    Monckton, 416.
  Hay;
    Koops, 11.
    Clift, 113.
    Castelain, 122.
    Fraser, 137.
    Pariset, 139.
    Rennel, 263.
    Johnson (*De Cassan and Meyer*), 294.
    Vautier, 324.
    Gedge (*Bardoux*), 346.
  Hemp:
    Bladen, 1.
    Hooper, 5.
    Koops, 11.
    De la Garde, 27.
    De la Garde, 27.
    Gibbs, 36.
    Gibbs, 53.
    Coupier and Mellier, 85.
    Collins, 95.
    Bargnano, 98.
    Jackson, 107.
    Helin, 120.
    Collyer, 233.
    Collyer, 238.
    Wheeler, 255.
    Dahmen, 264.

- **Raw materials for making paper**—*cont.*
  - Hemp—*cont.*
    - Vautier, 284.
    - Jaille, 295.
    - Treuille and Traxler (*Olier*), 309.
    - Henry (*Vasseur and Janssens*), 326.
    - Gedge (*Bardoux*), 346.
    - Gray, 350.
    - Arrott, 353.
    - Gray, 368.
    - Chadwick and Clench, 368.
    - Newton (*Brown*), 417.
    - Mennons (*Cauzique*), 431.
    - Newton (*Eckel, Schuyler, and Gillies*), 432.
    - Rowan, 437.
    - Walker, 439.
    - Haseltine (*Jones, Farquharson and Cotton*), 441.
    - Nelson, 442.
    - Newton (*Tilghman*), 447.
  - Hops (bines or stems);
    - De la Garde, 27.
    - De la Garde, 27.
    - D'Harcourt, 45.
    - Balmanno, 46.
    - Mac Gauran, 59.
    - Barling, 103.
    - Barling, 106.
    - Holt and Forster, 110.
    - Taylor, 114.
    - Plunkett, 166.
    - Brooman (*Picard*), 295.
    - De Wyldé (*Dupont*), 305.
  - Hops (refuse);
    - Crosley, 49.
    - Crosley, 117.
    - Hodge, 226.
    - De Maegt, 250.
  - Hops (roots);
    - Barling, 138.
    - Brooman (*Picard*), 282.
  - Horse radish;
    - Thatcher, 113.
    - Hill, 119.
    - Kelk, 136.
    - Jennings, 232.
    - Holt, 303.
  - Indian grass;
    - Jackson, 107.
  - Jerusalem artichokes;
    - Johnson, 125.
    - De Frontin, 131.
  - Junceæ;
    - Wicks and Ghislin, 159.
  - Jute;
    - Calvert, 71.
    - Nerot, 73.
    - Coupier and Mellier, 85.
    - Jackson, 107.
    - Helin, 120.
    - Smith and Hollingworth, 126

- **Raw materials for making paper**—*cont.*
  - Jute—*cont.*
    - Lea and Sherring, 200.
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6. An exact and true definition of the stupendous Water-commanding Engine invented by the Right Honourable (and deservedly to be praised and admired) Edward Somerset, Lord Marquis of Worcester, &c. &c. (*Stat.* 15 *Car. II. c.* 12. *A.D.* 1663.) Price 4*d.*; by post, 4½*d.*
7. Navigation improved; or the art of rowing ships of all rates in calms with a more easy, swift, and steady motion than oars can. By Thomas Savery. (*Letters Patent, No.* 347, *dated* 10*th Jan.* 1696.) Price 1*s.*; by post, 1*s.* 0½*d.*
8. The Miner's Friend; or an engine to raise water by fire, described, &c. By Thomas Savery. (*Letters Patent, No.* 356, *dated* 25*th July* 1698, *and Stat.* 10 *&* 11 *Will. III. No.* 61, *A.D.* 1699.) Price 1*s.*; by post, 1*s.* 1*d.*
9. Specimina Ichnographica; or a brief narrative of several new inventions and experiments, particularly the navigating a ship in a calm, &c. By John Allen, M.D. (*Letters Patent, No.* 513, *dated* 7*th August* 1729.) Price 8*d.*; by post, 9*d.*
10. A description and draught of a new-invented Machine for carrying vessels or ships out of or into any harbour, port, or river against wind and tide, or in a calm, &c. By Jonathan Hulls. (*Letters Patent, No.* 556, *dated* 21*st December* 1736.) Price 8*d.*; by post, 9*d.*
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12. The letter of Master William Drummond for the construction of machines, weapons, and engines of war for attack or defence by land or sea, &c. Dated the 29th September 1626. (*Scotch Patent, temp. Car. II.*) Price 4*d.*; by post, 4½*d.*
13. Contributions to the History of the Steam Engine, being two deeds relating to the erection by Messrs. Boulton and Watt of steam engines on the United Mines at Gwennap, Cornwall, and at Werneth Colliery, near Oldham, Lancashire. From the originals in the Patent Office Library. Price 10*d.*, by post, 10½*d.*

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